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CANADIAN MARCONI COMPANY 65TH ANNUAL REPORT 1967



THE FIRST NAME IN RADIO-ELECTRONICS



CANADIAN MARCONI COMPANY

Head Office and Plant:
2442 Trenton Avenue, Montreal 16,
Quebec, Canada

Directors

C.-E. BELANGER, C.A.
Senior Partner
Bélanger, Saint-Jacques, Sirois, Comtois & Cie
Sherbrooke, Canada

J. A. BOYD
Vice Chairman
Canadian Marconi Company
Toronto, Canada

L. M. DALEY
President
Canadian Marconi Company
Montreal, Canada

S. M. FINLAYSON
Chairman and Chief Executive Officer
Canadian Marconi Company
Montreal, Canada

HAZEN HANSARD, Q.C.
Senior Partner
Cate, Ogilvy, Bishop, Cope, Porteous & Hansard
Montreal, Canada

HON. A. K-HUGESSEN, Q.C.
Counsel
Smith, Davis, Anglin, Laing, Weldon & Courtois
Montreal, Canada

H. J. LANG
President and Chief Executive Officer
Canada Iron Foundries Limited
Montreal, Canada

THE RT. HON. LORD NELSON OF STAFFORD
Chairman and Chief Executive
The English Electric Company, Limited
London, England

J. G. NOTMAN, O.B.E.
Director
Canadair Limited
Montreal, Canada

I. D. SINCLAIR, Q.C.
President
Canadian Pacific Railway Company
Montreal, Canada

R. TELFORD, C.B.E.
Managing Director
The Marconi Company, Limited
London, England

Officers

S.M. FINLAYSON
Chairman and Chief Executive Officer

L. M. DALEY
President

R. R. LANTHIER, C.A.
Vice President — Finance and Treasurer

F. B. DANCER, C.A.
Vice President and Comptroller

S. B. HAYWARD
Vice President — Broadcasting Division

W. BAILLIE
Vice President — Commercial Products Division

J. A. HOWLETT
Vice President — Industrial Relations Division

H. A. HAMILTON, Ph.D.
Vice President — International Division

J. H. MARTIN
Vice President — Marine and Land Communications Division

R. MACLEOD
Vice President — Special Services Division

C. W. PERRY
Secretary

E. D. HICKIN
Assistant Treasurer

Registrar

MONTREAL TRUST COMPANY
Montreal, Canada

Transfer Agent

CANADA PERMANENT TRUST COMPANY
625 Dorchester Blvd. West, Montreal, Canada

Auditors

PRICE WATERHOUSE & CO.
Montreal, Canada

Bankers

BANK OF MONTREAL
FIRST NATIONAL CITY BANK
BANK OF AMERICA



The design for our cover is that of the Centennial Symbol of Canada. The Maple Leaf, recognized at home and abroad as Canada's emblem, in this stylization is the centennial symbol, its eleven constituent triangles representing the ten Provinces and Yukon and North West Territories. Together with the dates, it serves admirably as a visual reminder of our 100th birthday celebration.

Pour obtenir un exemplaire en français de notre rapport annuel, veuillez écrire au secrétaire, Canadian Marconi Company, 2442 Trenton, Montréal 16, Qué., Canada.

Financial Highlights

	1967	1966	1965	1964
Sales and revenues	\$70,071,000	\$61,578,000	\$60,473,000	\$54,128,000
Income from operations	8,951,000	10,999,000	9,835,000	8,141,000
Depreciation and amortization	2,540,000	2,483,000	1,939,000	1,434,000
Net income	26,000	1,631,000	2,236,000	2,023,000
Number of shares issued	5,943,192	5,402,902	5,402,902	4,554,682
Net income per share	—	.30	.41	.44
Dividends	594,000	540,000	810,000	569,000
Dividends per share10	.10	.15	.12½
Shareholders' equity	18,818,000	17,406,000	17,016,000	12,770,000
Shareholders' equity per share	3.17	3.22	3.15	2.80
Working capital	13,112,000	8,808,000	12,819,000	7,624,000

The Annual General Meeting of Shareholders will be held at the Company's Head Office in the City of Montreal, 380 Aberdare Road entrance, on Monday morning, April 1st, 1968 at 11:00 o'clock.

Canadian Marconi Company is a subsidiary of The English Electric Company, Limited, a world-wide organization with headquarters in London, England. Employing more than 110,000 people, English Electric has annual sales of over \$1 billion.

Directors' Report to the Shareholders

1967 continued the growth of CMC with sales reaching an all-time peak of 70 Million Dollars, some fourteen percent over 1966.

As indicated in our semi-annual report issued August 1967, your Company sustained a loss in the first six months of the year but, as predicted, this was offset in the later months, resulting in an overall profit of \$26,036. after income taxes. Canadian operations were moderately profitable while U.S. business through Kaar resulted in a loss.

The burden of development and preproduction expenses incurred in earlier months began to be offset by recoveries from production toward the end of the year. In 1967 exports accounted for some 60% of all manufactured products. Your Company entered 1968 with the largest order backlog in its history, most of this business arising from modern designs for aeronautical and telecommunication equipment.

Television broadcasting activities continued to be successful despite rising costs and the introduction of colour and the return on radio station operations increased over 1966. During the year the proportion of colour television programming increased sharply and now exceeds 80% in evening hours and 60% overall. We plan further increases in these percentages in 1968.

In May 1967 a new International Division was formed:

- a) to accomplish an increase in the Company's operations in international markets;
- b) to act as a liaison group for inter-company trading and relations with members of English Electric operating in the electronic field. In this latter connection English Electric and its subsidiaries have been working closely with your Company on several major projects which could affect to an important degree the growth and profit potential of your Company.

To our great regret, ill-health forced our President, Mr. W. V. George, to retire early as at June 30th last. Mr. L. M. Daley, formerly Executive Vice President — Operations, was appointed a Director and elected President to succeed Mr. George, who continues to serve as a consultant. Mr. A. G. McCaughey, C.A., Executive Vice President — Finance and Secretary-Treasurer, resigned in August. Mr. R. R. Lanthier, C.A., was appointed Vice President — Finance and Treasurer and Mr. C. W. Perry, formerly Assistant Secretary, was appointed Secretary, both with effect from August 12th.

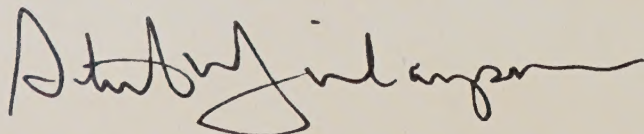
Sir Gordon Radley, who has been reducing his responsibilities within the English Electric Company, resigned effective December 31st and on January 29th, 1968 Mr. R. Telford was appointed a Director. Mr. Telford is the Managing Director of The Marconi Company of Chelmsford, England, and brings to this appointment a long and successful background in the electronics business.

An interim dividend of 5 cents was paid on June 30, 1967 and a final dividend of 5 cents on December 29, 1967, respectively.

Your Company's volume is expected to show further growth in 1968 and we expect that, given reasonable stability in the international economy, there should be some profit recovery in 1968.

The directors wish to record their appreciation of the loyal and efficient service of the Company's employees now numbering more than 4,300.

On behalf of the Board of Directors,



Chairman and Chief Executive Officer.

Montreal, January 29, 1968

Consolidated Statement of Income

for the year ended December 31, 1967

CANADIAN MARCONI COMPANY AND SUBSIDIARY COMPANIES

	1967	1966
Sales and revenues	\$70,071,000	\$61,578,000
Income from operations before the charges shown below (Note 3)	\$ 8,951,072	\$10,998,903
Research and development (Note 4)	4,401,200	4,986,810
Depreciation	2,539,734	2,483,235
Interest (Note 5)	1,284,102	997,852
	8,225,036	8,467,897
Income before income taxes	726,036	2,531,006
Income taxes (Note 6)	700,000	900,000
Net income	\$ 26,036	\$ 1,631,006

Consolidated Statement of Source and Application of Funds

for the year ended December 31, 1967

CANADIAN MARCONI COMPANY AND SUBSIDIARY COMPANIES

Sources of funds:	1967	1966
Operations —		
Net income	\$ 26,036	\$1,631,006
Add: Depreciation	2,539,734	2,483,235
	2,565,770	4,114,241
Deduct: Balance of estimated cost of terminating the Home Electronics Division operations, less applicable income taxes	—	700,000
	2,565,770	3,414,241
Proceeds of sale of 7% unsecured sinking fund debentures, series B	3,412,500	—
Proceeds of issue of capital stock	2,161,160	—
Decrease in working capital	—	4,010,682
	\$8,139,430	\$7,424,923
Application of funds:		
Additions to fixed assets (net)	\$2,695,110	\$5,819,030
Increase in sundry assets	352,926	101,603
Repayment of long-term debt	100,000	964,000
Expenses of issue of shares and debentures	93,952	—
Dividends	594,319	540,290
Increase in working capital	4,303,123	—
	\$8,139,430	\$7,424,923

Consolidated Balance Sheet

December 31, 1967

CANADIAN MARCONI COMPANY AND SUBSIDIARY COMPANIES

Assets

1967

1966

Current assets:

Cash	\$ 190,906	\$ 146,640
Accounts receivable	16,596,893	11,620,471
Inventories, at the lower of cost or net realizable market	16,967,154	18,920,093
Prepaid expenses	1,755,235	1,597,665
	<u>35,510,188</u>	<u>32,284,869</u>

Sundry assets:

Deferred accounts receivable	472,925	126,090
Investments in and advances to associated companies, at cost less amounts written off	110,982	104,891
	<u>583,907</u>	<u>230,981</u>

Fixed assets:

Land, buildings and equipment, at cost	26,683,153	24,613,005
Less: Accumulated depreciation	12,260,452	10,345,680
	<u>14,422,701</u>	<u>14,267,325</u>
	<u>\$50,516,796</u>	<u>\$46,783,175</u>

Approved on behalf of the Board:

L. M. Daley, Director

S. M. Finlayson, Director

Liabilities and Capital

Current liabilities:

	1967	1966
Bank loans and acceptances	\$11,815,570	\$12,600,859
Accounts payable and accrued liabilities	9,446,633	10,136,747
Accrued income taxes	998,807	633,398
Sales and excise taxes payable	137,630	105,440
	<u>22,398,640</u>	<u>23,476,444</u>

Long-term debt (Note 1):

5¾% unsecured sinking fund debentures, series A, due May 1, 1988	5,800,000	5,900,000
7% unsecured sinking fund debentures, series B, due June 1, 1989.	3,500,000	—
	<u>9,300,000</u>	<u>5,900,000</u>

Capital:

Capital stock		
Authorized —		
7,500,000 shares of \$1 each		
Issued —		
5,943,192 shares (1966 — 5,402,902 shares — Note 2)	5,943,192	5,402,902
Contributed surplus (Note 2)	4,272,403	2,651,533
Retained earnings	8,602,561	9,352,296
	<u>18,818,156</u>	<u>17,406,731</u>

Contingent liability:

Notes and accounts receivable discounted	<u>\$1,850,000</u>	
	<u>\$50,516,796</u>	<u>\$46,783,175</u>

Auditors' Report

To the Shareholders of Canadian Marconi Company:

We have examined the consolidated balance sheet of Canadian Marconi Company and subsidiary companies as at December 31, 1967 and the consolidated statements of income, retained earnings and source and application of funds for the year then ended. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion these financial statements present fairly

the financial position of the companies as at December 31, 1967 and the results of their operations and the source and application of their funds for the year then ended, in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

PRICE WATERHOUSE & CO.,
Chartered Accountants.

January 29, 1968

Consolidated Statement of Retained Earnings

for the year ended December 31, 1967

CANADIAN MARCONI COMPANY AND SUBSIDIARY COMPANIES

	1967	1966
Retained earnings, beginning of year	\$9,352,296	\$ 8,961,580
Net income	26,036	1,631,006
	<u>9,378,332</u>	<u>10,592,586</u>
Deduct:		
Discount (\$87,500) and expenses on sale of 7% sinking fund debentures, Series B	108,969	—
Expenses of issue of capital stock	72,483	—
Balance of estimated cost of terminating the Home Electronics Division operations, less applicable income taxes	—	700,000
Dividends — 10 cents per share	594,319	540,290
	<u>775,771</u>	<u>1,240,290</u>
Retained earnings, end of year	<u>\$8,602,561</u>	<u>\$ 9,352,296</u>

Notes

to Consolidated Financial Statements December 31, 1967

Note 1: Sinking fund provisions of the Series A and B debentures require annual payments aggregating \$100,000 in 1968, \$158,000 in the years 1969 and 1970, \$208,000 in 1971, and \$237,000 in 1972. In 1967, debentures having a face value of \$100,000 were purchased to meet the 1968 requirement in respect of the Series A debentures.

Note 2: On June 1, 1967, pursuant to an offer to shareholders to subscribe for one additional share at a price of \$4 for each ten shares held, the company issued 540,290 shares for \$2,161,160 cash. The excess of the proceeds over the par value of the shares issued, amounting to \$1,620,870, was credited to contributed surplus.

Note 3: Income from operations is stated after charging remuneration of directors and of officers who are directors — \$117,500.

Note 4: Research and development costs have been reduced in 1967 by an amount of \$665,000, representing the estimated amount of the grant for which the company is eligible under the Industrial Research and Development

Incentives Act, and which is included in accounts receivable in the accompanying balance sheet. In 1966, in lieu of a grant, the company was able to claim as a deduction from income for income tax purposes the additional allowances available in respect of research and development costs under the income tax regulations then in effect, thereby reducing taxes otherwise payable by approximately \$1,400,000.

Note 5: Interest expense includes \$482,170 on long-term debt.

Note 6: The United States subsidiaries incurred operating losses in 1967 and 1966, which cannot be charged against Canadian earnings for income tax purposes. Provision for income taxes is therefore based upon the income of the Canadian companies.

Note 7: The accounts of United States subsidiaries have been translated into Canadian dollars at the rate of \$1.08 to the U.S. dollar. This rate has not changed materially since inception of the United States subsidiaries.

Corporate Affairs

The Manpower Development group in the Industrial Relations Division increased its activities by following up initial training for managers and supervisors with intensive six-day seminars in advanced management concepts. Toward the end of the year this activity moved on to a continuing series of study sessions designed to improve team work through more effective integration, problem-solving and higher standards. Parallel to this is the development of a skills inventory of employees, which will provide the Company with a sophisticated system of accelerating the best selection of personnel, according to education, training, skills and experience, when filling job vacancies from within.

No major construction of new buildings and interiors was undertaken during 1967, but 30,000 sq. ft. of space was leased to house the precision casting operation and supplement existing warehousing. The Company moved its branch offices in Vancouver and Toronto into newly built, leased, quarters.

It is presumed that most readers of this report are aware of the success of EXPO 67 and it is hoped that many of you were able to visit this exciting International and Universal Exhibition, held in Montreal. A sequel to the Company's participation at EXPO, in the Quebec Industries Pavilion and the Pavilion of Economic Progress, was the recent presentation of the "PEP" building to the City of Montreal, whose plans are to perpetuate much of the Exhibition and its theme "Man and His World".



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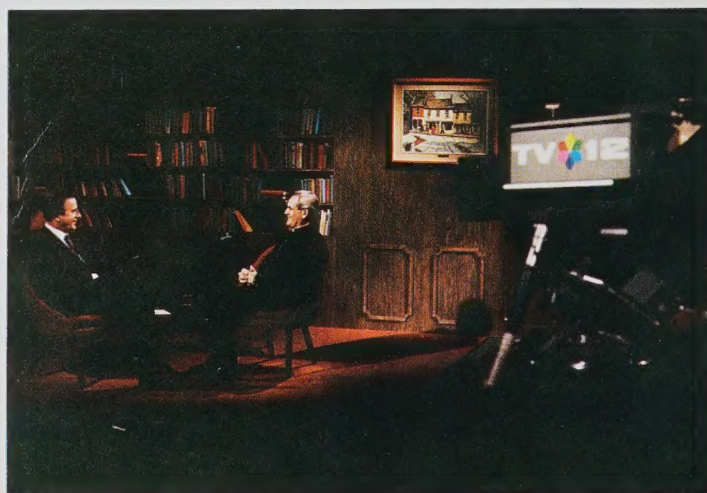


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1. Mayor Jean Drapeau (rt.), acting on behalf of the City of Montreal, is presented with the Pavilion of Economic Progress by its Directors, who represent the 24 co-sponsoring companies which had joined together to tell the story of Canada's economic progress at EXPO 67.

2. The Data processing centre prior to the recent introduction of two magnetic tape units, a third disc drive and a paper tape reader.

Broadcasting Division



1967 was a particularly interesting, challenging and rewarding year for the Broadcasting Division since our radio and television stations, along with all Montrealers, played host to the World through EXPO 67, certainly the highlight of Canada's Centennial year.

For CFCF Radio, CFQR-FM and CFCF-TV, involvement in the World's Fair took many forms to ensure that the stations were, in the mainstream of the EXPO news, instantly in touch with major programming events and continually and prominently in public view. The Broadcasting Division had a futuristic studio designed and installed in The Pavilion of Economic Progress. Many programs originated from this location and many of our air personalities were seen by tens of thousands of visitors touring the building's exhibit hall. It is interesting to note that many of the programs produced by the Division on the subject of EXPO were later scheduled on other radio and television stations across Canada and the United States.

While a great deal of attention has been focused on EXPO 67, it was still necessary, of course, to provide our listeners and viewers with an around-the-clock popular balance of information and entertainment. And in this respect, much progress was evident in 1967. CFCF Radio 600 continued to stress immediate, factual news service provided by facilities in Montreal —

together with strong, popular air personalities. CFCF-TV, with the strongest program schedule in its history, now transmits 82% of its evening shows in colour; CFQR-FM, with encouraging audience gains in the competitive Montreal FM market, moved from 18 to 24 hours-a-day of separate stereo programming on November 1st.

Finally, the Division was proud to send sixteen district high-school students on a three-week Canadian coast-to-coast tour this past summer. This was the second year that winners from CFCF-TV's "Challenge" series travelled this great country, and it was particularly appropriate during 1967 — Canada's Centennial year.

CFCF-TV continues to be interested in the important area of national television through its sizeable ownership in the CTV Television Network, and is represented on its Board of Directors by the Vice-President of the Broadcasting Division.

1. Joe Van, CFCF radio's mid-morning and early afternoon man.
2. "The Buddies" a children's comedy show, seen in color on TV-12, starring Ted Zeigler and Peter Cullen.
3. The mobile news fleet of CFCF-TV and radio.
4. "A Conversation with Cardinal Leger", a program "special" originating at CFCF-TV and seen on the Canadian Television Network.

Commercial Products Division

In 1967 the Commercial Products Division maintained its position as a leader in the defense electronics industry, producing advanced avionics and telecommunications equipment to meet the very stringent operational requirements of military users.

In the Avionics area, primary activities continue to center around exploitation of the very substantial background which has been built up in the area of self-contained navigation, based on the use of Doppler velocity sensors. Doppler activity is focused on the design and production of sensors for use in many advanced aircraft. The Dopplers are of extremely advanced design and will serve to guarantee a very active future for our avionics products in this area.

In the Telecommunications area our Tactical Radio Relay equipment is currently in large-scale production for two NATO nations, and further production orders are expected shortly. Sales activity continues at a high level and evaluation programs are underway or scheduled in other NATO nations.

Development work is progressing on extension of the capability of this system and in the area of specialised test equipment for depot maintenance purposes. This work further enhances the sales prospects of the system.

A new area of activity and one that has become a highly important addition to our manufacturing capability is the precision casting of special parts products. This section was introduced into our production system because outside suppliers were unable to supply the quantities we require under stringent specifications.

1. The CMC air fleet includes the Radio and TV, Hughes 300, traffic copter hovering above the Avionics Department DC-3, Sikorsky S-55 and Leau jet, essential in the development of airborne navigation systems.

2. A step in photo etching. One of many processing skills involved in the manufacture of micro-circuits.

3. The comprehensive test bench installed in the DC-3, used in the development of CMC airborne navigation systems.

4. A tactical radio relay unit undergoes a final bench test.

5. Special Parts Products Department makes precision castings used in avionics and telecommunications systems.

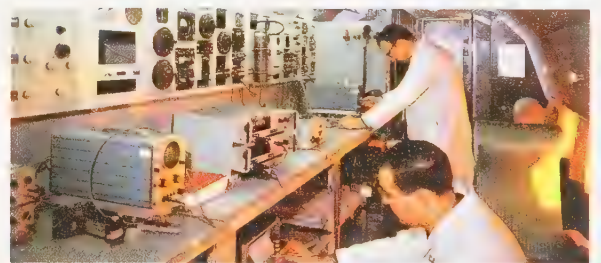
6. General Johann Adolf Graf Von Kielmansegg, Commander, Allied Forces Central Europe, examines an avionics component during his visit to CMC head office and plant.



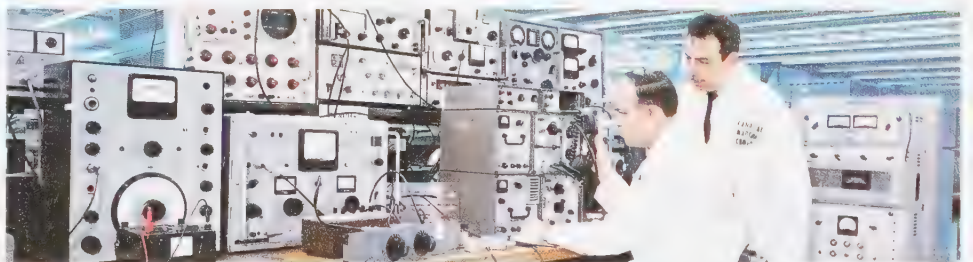
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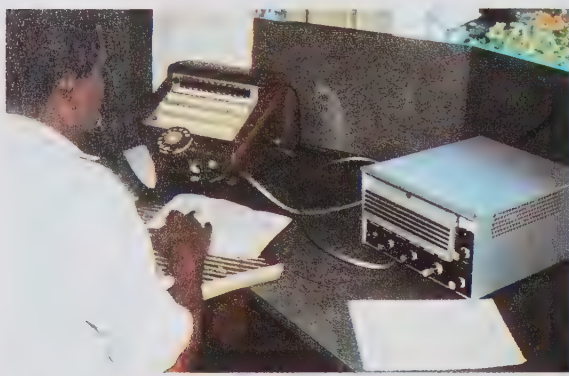


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International Division



The International Division is a newly formed Division charged broadly with the responsibility of the international operations of the Company. The task may be divided generally into two areas.

Firstly, the sale of products of the Company outside North America. This includes commercial communications equipments such as the Company's modern mobile radio telephone and transistorised HF SSB products, which have been exported to over 40 countries. This business is, for the most part, obtained through a network of agents and representatives maintained in most countries of the free world. Substantial business has been obtained and a large potential exists for modern military tactical communications equipment designed and manufactured by the Company.

The second area of activity of the International Division is the representation of the Marconi group of companies of the United Kingdom in Canada and in some instances the United States. This group has a very wide and comprehensive product range, from high performance commercial broadcasting equipment to major military and commercial integrated communications systems, from complex computers and automated control systems to high performance radars and modern components and instruments.

A competent organization has been established to accomplish these tasks. This enterprise is backed by the wide resources of the remainder of the Company in areas such as systems engineering, installations, contract management and after sales service.

The establishment of the International Division is tangible evidence of the belief that the Canadian Marconi Company has a continuing and expanding role to play in international business.

1. CH25's play an important role in the communication network of the State Engineering Corporation, Ceylon.
2. The Nigerian Port Authority at Lagos use a CH25 high frequency single sideband transmitter/receiver in its communications work.
3. The base station of the Department of Aborigines, Malaysia. CH25's make up this country-wide communications system.
4. The East African Meteorological Department has incorporated a QJ27 VHF-FM receiver as part of its weather satellite system.

Special Services Division

1967 was a steady year for the Special Services Division, which specializes in installation, operation, repair and maintenance of communications and radar equipment and systems plus facilities such as heating, lighting, power and other utilities normally associated with the anticipated work load. The cancellation of the contract with the Province of Quebec for utilities maintenance at Great Whale River was offset by the acquisition of new work at EXPO 67. Total strength of the Division remained at approximately four hundred and seventy-five personnel.

The field project for on-site operation and maintenance of the U.S.A.F. communications system at several locations in Labrador and Newfoundland was renewed with a minor reduction in work requirement resulting from the conversion of one site to commercial operation. The associated project, based in St. John's, Newfoundland, providing depot level maintenance and expert technical support for communications, radar, and diesel electric power on the same system, was increased somewhat in scope to include more support in the re-supply of consumable and replacement items.

In Montreal the two major repair and overhaul depots maintained anticipated work loads in connection with the repair and refurbishment of heavy ground radar and airborne communications equipment. Engineering programs for better equipment performance and the introduction of automatic data processing methods for control of stocks and work-in-process are showing results in improved efficiency in these operations.

This year activities in the precision instruments section were encouraging with an increase in work load plus indications of a considerable amount of potentially new business. The demand from Government Agencies and Communications Companies for resources to check and maintain the accuracy of measuring instruments is increasing and several large contracts are scheduled for open competition in the near future. With its proven capability, Special Services is optimistic of its chances of obtaining a sizable portion of this new business.

The Installations Section completed contracts for the supply and installation of log periodic high frequency transmitting and receiving antennas in Eastern Canada and installed the aircraft control facilities at the airport in St. Pierre-Miquelon. A contract was obtained and work started on the renovation of power distribution systems in several communities in the far North. This group also undertook and carried out the maintenance of sound equipment for EXPO 67. Some fifty technicians performed preventative and corrective maintenance on all the sound and public address systems operated by C.C.W.E. for the duration of the World's Fair.

1. Putting the antenna housing into position, completes one of thirty dual tactical air navigation (TACAN) installations carried out by the Company at airports across Canada.
2. The Company has played an important part in the construction, maintenance, repair and overhaul of North American defence sites.
3. Towing another prefab house into position at Pangnirtung in the North West Territories. CMC installed the electrical services under contract to the Department of Indian Affairs and Northern Development.



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Marine and Land Communications Division and



1. The Dawson, an oceanography vessel, contains communication and navigation equipment made and installed by CMC.
2. The wheelhouse, on the Dawson, shows radio-telephones and the PA installed by CMC.
3. McAllister Bros., Inc. relies on Kaar Electronics Corporation to provide equipment to meet their stringent communications and navigational requirements.
4. The assembly area of the Marine & Land Communications Division.

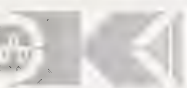


In its pursuit of the American land mobile market, the Company introduced its high powered DT76, very high frequency (VHF) transistorized mobile radio, available with a choice of three power inputs: 200, 180 and 120 watts, to satisfy the various types of service specified by the Federal Communications Commission. One of the first systems to be installed involved twenty-one units for Jersey City, New Jersey.

The maritime VHF services in both Canada and U.S.A. have had a need for a transistorized monitor receiver. To fill this need, the Company's model QJ75 is now being introduced in the U.S.A. with introduction in Canada to follow in a few months' time. Telephone companies serving the inland waterways of the United States are making it mandatory that all ships now using land mobile VHF radio telephone service replace these units with radios which operate on the international marine frequencies. To fill this market requirement, a five channel VHF "Clipperphone" was introduced late in the year.

Following the successful introduction of our transistorized "Voyageur" marine radar, last year, we have presented a new and larger antenna, which extends the definition capability of this model. The antenna can be used with the existing 10-inch display or the new 5-inch display designed with yachts and small commercial craft in mind and being introduced during the 1968 Boat shows in the U.S.A. An unusual application for the "Voyageur" was its use to assist in accurately laying out the buoys marking the yacht racing course at the Pan American Games, held in Winnipeg.

Several interesting applications of Canadian Marconi and Kaar Electronics communications systems are in use or are in the process of being installed. Kaar is installing two key Public Coast Stations on the Inland Rivers, at Jeffersonville, Indiana, for American Commercial Line, Station WFN and also at Memphis for Warner & Tamble, Station WJG. The stations will be equipped with 1 KW single sideband and 60 Watt VHF units, supplying communications to the towboat operators along the Mississippi River and



its tributaries. Two recent comprehensive installations of communication and navigation equipment were carried out on board the Canadian National ferry, Frederick Carter, and the Department of Energy, Mines and Resources, Bedford Institute of Oceanography vessel, Dawson. Areas equipped were the wheelhouses and radio rooms of both ships and the Purser's Office of the Frederick Carter and the Scientific Lab. of the Dawson. Systems included MF, HF and VHF radiotelephones; wireless telegraphy; automatic direction finders; DX navigator Loran; sonar; a depth sounder; an entertainment unit and community antennas for radio and TV. The Emergency Measures Organization in Manitoba is now using a combination VHF and single sideband mobile radio system designed to talk between base locations and vehicles and from car to car using whichever equipment and frequency is best able to provide communication at that particular time. The Quebec Roads Department is operating CMC's new transistorized VHF equipment using special directional antenna arrays in several of their districts including the new Louis Hippolythe Lafontaine tunnel under the St. Lawrence River. Another VHF network installation was that designed for the Aluminum Company of Canada at their new bauxite operation in Jamaica. Also the Company provided the official marine electronic service at the EXPO 67 marina.

The Marconi Company, England, purchased a substantial quantity of our single sideband units during the past year, while The Marconi International Marine Company, England, in addition to selling our SSB units for marine purposes, also placed orders for a number of "Voyageur" Radar units.

Appointment as Canadian Distributor for Anschutz & Co. of Kiel, Germany, manufacturers of gyro compasses, automatic pilots and steering apparatus, helps to make our presentation to the Canadian shipowner more complete.

To keep pace with our growing sales and service volume, new premises were occupied in Vancouver, Nanaimo, Winnipeg and Toronto, while new service depots were opened in Hamilton, Ont. and Port McNeill, B.C.



1. The Province of Quebec Ministry of Roads relies on Canadian Marconi for efficient radiotelephone communication to cover much of its vast road network. Pictured is the central dispatching for the areas of Montreal, Soulanges and Vaudeuil.

2. A Quebec Ministry of Roads snow plow demonstrates its prowess.

3. CN Ferry, Frederick Carter, is well equipped with communication systems made and installed by CMC.

4. The radio room of the Frederick Carter.





AR29



THE FIRST NAME IN
RADIO-ELECTRONICS

Field
CANADIAN MARCONI COMPANY

1963



RESOURCES

•

SKILLS

•

ACHIEVEMENTS

•

SERVICES





CANADIAN MARCONI COMPANY

THE FIRST NAME IN
RADIO-ELECTRONICS

The Company is comprised of four Operating Divisions all reporting to Corporate General Management. All four Divisions have their headquarters in Montreal. Two of them, Commercial Products and Marine and Land Communications in the main plant on Trenton Avenue; Broadcasting in its own building on Ogilvy Avenue and Special Services in another building on Darnley Road. In addition there are Branch Offices and service facilities strategically located across Canada and through the wholly owned subsidiary, Kaar Electronics Corporation, sales, service and manufacturing facilities in the United States. The Company is represented in most countries of the free world.

In Canada, the Company employs some 4000 people, of which 3463 are in Montreal at the Head Office and the two separately located Division Buildings. The remainder are located coast to coast in branch offices, service depots and field operations. Additionally the Company's subsidiary Kaar Electronics Corporation in the United States, employs some 225 people, coast to coast. As the products and services of Canadian Marconi Company are highly technical the employee complement includes some 183 graduate engineers and 410 technicians.

The Head office and plant facilities total 420,000 square feet and are growing, in a city block of 343,300 square feet. In addition, the Company owns or leases 275,000 square feet for employee and customer parking.

It is interesting to note that these premises are located in a good residential area and the Company takes great pride, with its neighbours, in maintaining an attractive environment.

Because the Company is involved in defence projects, it maintains a complete security force on company property, plus supplementary assistance on alarm. The security measures are subject to inspection by the Industrial Security Branch of The Department of Defence Production, to whom a monthly security report is submitted.

Guards are on duty 24 hours a day and are visited by a patrol car at least three times nightly. The plant is patrolled during the "quiet" hours.





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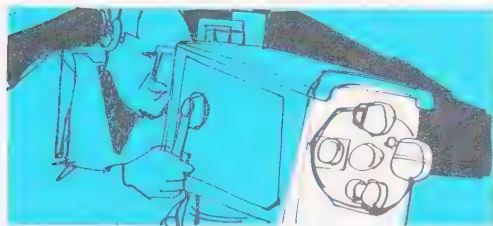
We wish to thank the Royal Canadian Navy for providing some of the photographs used in this booklet.

INTRODUCTION

This is not a technical product manual. It is, however, an outline to present a broad, general picture of Canadian Marconi Company (CMC) and to convey information on our products and services that we believe will be of interest in all the markets we serve.

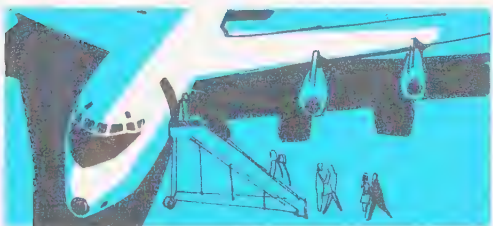
The unique and impressive list of CMC achievements is a matter of historical record and continuing fact. Super-imposed, on this background is a great inventory of human experience, knowledge and skill, together with resources of physical plant and equipment for solving the problems of the present and meeting the challenge of the future.

CANADIAN MARCONI COMPANY PRODUCTS AND SERVICES



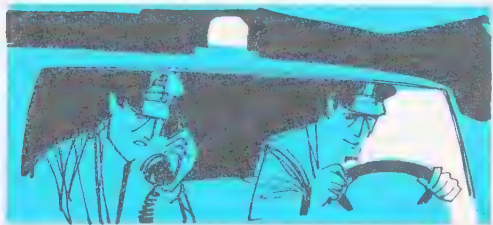
BROADCASTING DIVISION

Television and Radio broadcasting of entertainment, education, information and public service, over CFCF-TV, Channel 12, CFCF-AM (600 kc/s), CFQR-FM (92.5 mc/s) and CFCX-SW (6005 kc/s) Montreal. Producers of programs. Producers of commercials.



COMMERCIAL PRODUCTS DIVISION

Airborne Doppler sensors for fixed and rotary wing aircraft. Airborne computers and indicators for navigational and tactical use. Radio altimeters. High frequency transmitters and receivers, including single sideband systems. Tactical radio relay equipment. System engineering of navigation and communications systems. Repair and overhaul facilities for all its products.



MARINE & LAND COMMUNICATIONS DIVISION

High frequency AM and single sideband and very high frequency FM radiotelephone equipment. Selective and tone calling units. Hailing equipment. Direction finders. Echo sounders. Fish finders. Loran. Marine radar. Precision electronic test instruments and industrial control systems.



SPECIAL SERVICES DIVISION

Installation of radar, communications and air navigation equipment and systems. Construction and installation of large communications antenna systems. Installation, operation and maintenance of defence communications and detection systems, operation of large defence radar maintenance depot, diesel engine generator overhaul depot, and test equipment repair and calibration laboratory. Installation, operation and maintenance of high capacity communications systems. Commercial test equipment repair and calibration service.

CANADIAN MARCONI COMPANY WAS THE FIRST

1902 — in the Americas to construct and operate a permanent wireless station at Glace Bay, to form a transatlantic radio link with Europe and, in 1904, to establish wireless communications with ships at sea. In 1905, this station at Table Head was transferred six miles to a larger site near Port Morien. **1904** — in Canada to construct and undertake the technical maintenance of wireless stations. **1905** — to publicly demonstrate wireless in the United States of America, at Boston. **1907** — to introduce transatlantic public service between (Morien) Glace Bay and Ireland. **1912** — to erect, operate and maintain four wireless telegraph stations to serve the North American Great Lakes shipping service. In 1913 four more stations were added bringing the total to eight. — private enterprise company to operate wireless telegraph stations in Labrador and Newfoundland. — through its wireless station, at Cape Race, to notify the world of the sinking of the S.S. Titanic. **1913** — in the Americas to adopt high-speed duplex wireless telegraph transmission, for transatlantic use. **1919** — in the Americas to establish experimental commercial radio broadcasting. This station XWA, now CFCF, was located in Montreal and pioneered what were among the first regular broadcast programs anywhere in the world. **1920** — in Canada to carry out demonstrations of wireless telephone communication in numerous cities. **1921** — in Canada to design and manufacture home radio receivers. **1922** — in Canada to manufacture a marine direction finder. — in the Americas to establish duplex, automatic high-speed, wireless telegraph service for ship to shore communications. — in Canada to design and manufacture, tube type, home radio receivers. **1925** — to install radio telephone ship to shore service on Canada's West Coast. **1926** — in the Americas to operate shortwave "beam" stations. These were located at Yamachiche and Drummondville, Quebec, and linked to similar stations operating in the United Kingdom. In 1928 this service was further extended to include Australia and the United States. **1927** — to operate and install radiotelephone ship to shore service on Canada's east coast. — in Canada to design and install shortwave radiotelephones for point-to-point communication. circa 1927 — in Canada to design, demonstrate and install mobile radiotelephones. **1930** — to establish shortwave radiotelephone service to ships at sea. **1931** — through its radio station CFCF, in initiating the establishment of a Canadian radio network. This network formed the backbone of the Canadian Radio Broadcasting Commission founded in 1932, which subsequently became the Canadian Broadcasting Corporation. **1936** — to originate two-way transatlantic and transcontinental commercial radio broadcasting. The pioneer sponsor being

Imperial Tobacco. — **1935** — in collaboration with the Government of Canada to provide radiotelephone service to ships trading on the Great Lakes. **1947** — in Canada to install and operate a micro-wave radio relay communication circuit. **1948** — in Canada to develop and produce commercial marine radar equipment created in co-operation with the National Research Council. **1949** — in Canada through its radio station CFCF to establish separate frequency modulation (FM) programming. **1955** — to erect an electronic tube plant for the design and manufacture of magnetrons and microwave tubes for use in radar and communications equipment. **1956** — Canadian Company to design a complete microwave radio relay system in Canada, forming the so-called "Mid-Canada Defence Line". — to design, develop and operate single sideband microwave multi-channel equipment. — in Canada to design, manufacture and install a high-powered tropospheric scatter system, for experimental purposes. — in Canada to design and manufacture a tunable magnetron. **1957** — to develop a CW Doppler radar with applications for commercial and military air navigation. — in Canada to design and manufacture an advanced automatic direction finder. — in Canada to develop single sideband radiotelephones and HF equipment. — in Canada to develop 600-channel radio relay equipment using travelling wave tubes. **1958** — to develop, produce and install a 1,500 mile twin path broadband radio relay defence communication system for the Canadian Government. **1959** — to evaluate, prove and sell the world's most advanced airborne Doppler navigation aid to major international air lines. — in Canada to design and manufacture an airborne navigation computer for use with Doppler sensor equipment. — in Canada to manufacture travelling wave tubes. — in the Americas to design, develop and manufacture a commercial version true motion radar presentation used in conjunction with marine radar equipment. **1963** — in Canada to develop, produce and sell a light-weight transistorized airborne Doppler navigation system for use in fixed-wing, helicopter and V/STOL aircraft in operation with defence forces of the free world. — in Canada to install closed-circuit television as a navigation aid to commercial shipping. **1964** — in Canada to develop, produce and sell general purpose airborne Doppler navigation equipment for use in fixed-wing, helicopter and V/STOL aircraft in operation with defence forces of the free world. — Canadian Company to set up subsidiary and associate companies in the United States and Mexico respectively, for the purpose of manufacturing and marketing marine and land communications equipment and marine navigation aids. **1965** — to design, manufacture and market in North America a low-priced transistorized marine radar, with 10-inch display. — in Canada to design, manufacture and market a 100-watt transistorized, high frequency, single sideband transmitter.

THE HISTORY OF CANADIAN MARCONI COMPANY

Marconi at Signal Hill, Newfoundland, with the instruments with which he received the first transatlantic wireless signal on Dec. 12th, 1901.



More than seventy years ago, the young and inspired Guglielmo Marconi pondered over the possibility of communications being carried on between two points, and over any distance, by means of electro-magnetic impulse transmitted without wires. In 1895, working in an attic of his father's home in a village near Bologna, young Marconi succeeded in proving the practicability of his idea by getting electrically-agitated waves to travel across space. By employing successions of such waves, broken into code groups, intelligible messages were conveyed . . . and substance replaced the vision. Here then were the elements of wireless telegraphy, and such was the birth of modern telecommunications. By the end of 1895, Marconi had extended the range of reception to about 1½ miles.

As the sensitive young scientist applied himself to enlarging the scope of his discovery, a most singular person, his mother, pursued a course to secure recognition and financial support for her son's project. Signora Marconi, of Scottish and Irish ancestry and with a wealth of imagination, initiative and sheer perseverance, succeeded in arousing the interest of Sir William Preece of the General Post Office in London. As a result, Marconi was invited to come to England in February 1896. In June of that year, he took out his first patent — the first ever granted for wireless telegraphy — and five months later he successfully demonstrated his apparatus to Post Office officials over a distance of 100 yards. Shortly thereafter, he made history by establishing communication over a distance of 1¼ miles before a distinguished audience of Navy, Army and Post Office officials on Salisbury Plain. He repeated the performance over the Bristol Channel and Sir William Preece was convinced. Journals of the day faithfully recorded all details of the significant events taking place and public interest was aroused. December of 1896 saw Sir William lecturing on the new and thought-provoking invention, and Marconi conducted a personal demonstration. The day of "Telegraph without wires" had arrived. By May of 1897, Marconi had succeeded in receiving transmissions over a range of eight miles in the Bristol Channel with sufficient strength to operate a standard Post Office type recorder. This was a decisive point in the history of wireless and it constituted the basis from which all future developments derived. Thus it was that just one year after the Salisbury Plain experiment a company was formed to develop the new idea. It was July 20th, 1897. Called the "Wireless Telegraph and Signal Company Ltd.", its first Chairman was Mr. Jameson Davis, a relative of Marconi's mother. Three years later, the original name was changed to, "Marconi's Wireless Telegraph Company Ltd."

MARCONI'S BASIC PRINCIPLES OF WIRELESS

The outstanding innovation of Marconi's original system was the use of an aerial-earth circuit as a means of extending the range of transmissions. The original

11 Wednesday (345-20)

● New Moon, 2h. 53m. A.M.

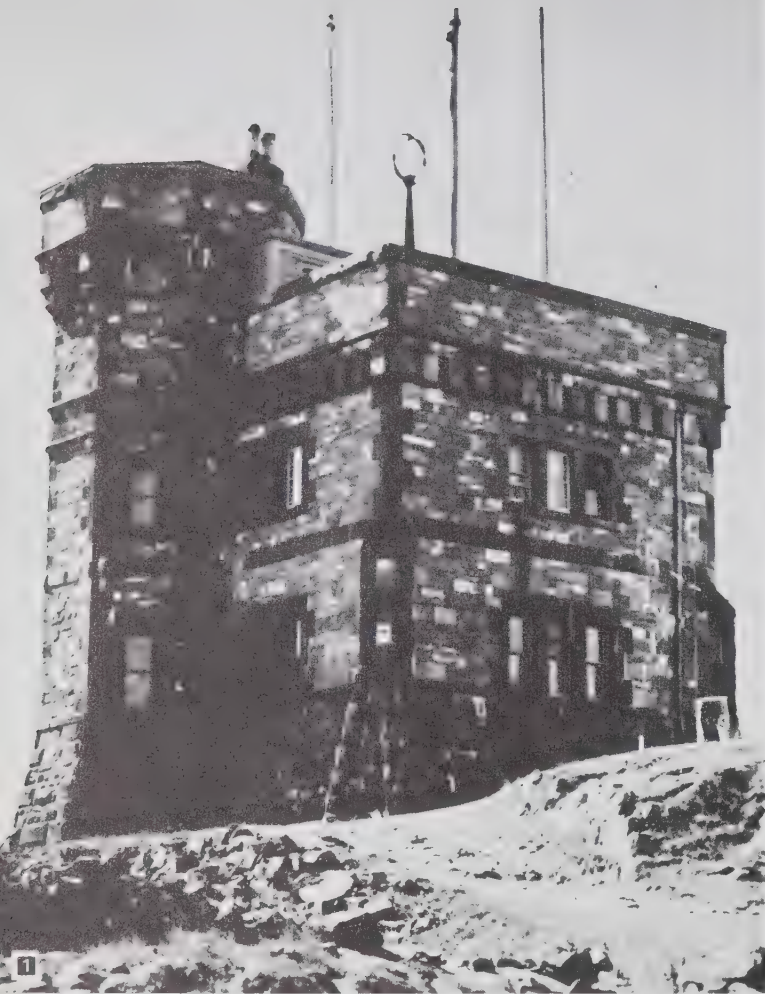
Cut Balloon up in
a strong Breeze
+ lost it at 3.9m
when it was blown
away.

Mr. Marconi trying
to get signs during
the time Balloon
was up on station

2 Receivers calling
me in at intervals

Cut legs 3452
(346-19) Thursday

Lost first kite
with two wires each
560 yds long after being
up for 1 hour
then got up another
kite with one wire
500 yds long & kept
it up 3 hours
which appeared
to fine life good



impulse in transmission was generated by an electric spark which was forced to leap across a gap from one metal ball to another. This spark was sufficient in itself for its effect to be detected by a receiving set, but its strength as a wireless signal was enormously increased if one of the metal balls at the spark site was connected by means of a vertical wire to a metal cylinder hoisted on a mast ("the aerial") and the other sphere to a metal earth plate. At the receiving end, a similar aerial-earth circuit was linked to a device known as a coherer. The principle of this device was based on the known effect of violent electric discharges, such as lightning flashes on collections of metal filings. Though in themselves of little cohesion, the filings were found to bind together, or "cohere", when subjected to electric impulse. With this action, a circuit was established through which, a local current could be passed until interrupted by controlled, mechanical, vibration of the filings. A tapping device caused the filings to decohere at the end of each impulse, and by this means signals from the transmitter could be received accurately.

Marconi unveiled his next great improvement in 1898. This was the introduction of "tuning" whereby the transmitting and receiving systems were brought into close electrical sympathy with each other so that the emanation of one caused the maximum reaction in the other. Thus, critical tuning became possible with consequent increase in signalling efficiency. This latest Marconi advance was included in the famous "four sevens" patent of 1900, a most significant milestone in the history of wireless communications.

MARCONI'S CONTINUING SUCCESS

Development work had now progressed to the point where startling events would soon make headlines around the globe and immortalize the name Marconi in the pages of history. The company now set about the construction, at Poldhu in Cornwall, of a transmitting station of much greater power than any they had previously erected. This enterprise was typical of the many in which the Marconi group, working entirely on their own initiative, led the world into the dawn of a New Age in Man's Progress. In September, 1901, a violent storm wrecked the first ring of twenty 210 foot masts

supporting the Poldhu aerial, but it did nothing to daunt the dedicated men of Marconi. Two new masts were quickly erected and a fan-shaped aerial was spread between them so that signalling tests could begin by the target date. During the same period, another small party of Marconi pioneers was setting up a temporary receiving station at St. John's in Newfoundland, and it was there, on December 12th, 1901, that Marconi and his assistants Kemp and Paget picked from space the fruit of all their efforts. Three faint dots, the letter "S" in code, spelled Success for the Company and presaged new and almost unbelievable advances in the field of communication. Immediately after his successful experiment, Marconi was forced to leave Newfoundland by the companies that had a monopoly on extra-territorial communications, so he relocated in Cape Breton, Nova Scotia with support from the Government of Canada. Now events moved quickly as the significance of the achievement was realized. First news report to describe Marconi's triumph was a cable to the New York Herald from its correspondent in St. John's. The cable announced: "Marconi has this day received wireless signals from Cornwall. Despatch follows". Before the correspondent had time to file his despatch, the Herald cabled back: "Your bulletin about Marconi seems incredible. Please be extremely careful . . . this report must be confirmed by Marconi. Rush reply and story". The Twentieth Century had barely arrived, remember, and scepticism was understandable. On December 14th, 1901, Marconi gave the press a full description of the experiment. The Montreal Gazette, after reporting the prevailing scene and excitement, reflected: "There is some speculation here as to the practicability of this scheme of wireless telegraphy . . . Marconi, however, is satisfied . . . that great surprises are in store for the world in this matter".

The world was soon to realize that this "incredible" experiment had launched a new era of communications. Time in space had been bridged and countries and people were closer to each other than they realized. Memorials to this occasion were erected by Marconi's Wireless Telegraph Company Limited, England, and Canadian Marconi Company in 1938 and 1939 respectively at Poldhu, England and Signal Hill, Newfoundland.

1 Cabot Tower, Signal Hill, Newfoundland. The point at which Marconi received the first transatlantic radio signal.

2 Pages from the diary of Kemp, assistant to Marconi: Dec. 11, 1901. Got balloon up in a strong breeze and lost it at 3 p.m. when it

was blown away. Mr. Marconi trying to get sigs during the time balloon was up on various receivers calling me in at interval. Dec. 12, 1901. Got sigs 3 dots. Lost first kite with two wires each 500 ft. long after being up for 2 hours. Then

got up another kite with one wire 500 ft. long and kept it up 3 hours which appeared to give sigs good.

3 Marconi (center) with Kemp and Paget, photographed at St. John's on arrival there in December 1901 for the first transatlantic

wireless tests. Behind them is one of the kites used for elevating the aerial.

4 Raising the kite aerial at Signal Hill, Newfoundland, for reception of the first transatlantic wireless signal, 1901. Marconi is the figure at the extreme left.

THE GROWING WORLD OF CANADIAN MARCONI COMPANY

Through development engineering CMC ensures it's continued growth and electronics leadership.



On November 1st, 1902, Marconi's Wireless Telegraph Company of Canada Limited was incorporated and in 1925 the company name was changed to the one it enjoys today, Canadian Marconi Company — CMC. The years which have followed since the name "Marconi" was incorporated into the mosaic of Canada's economy have seen dramatic changes take place throughout the world . . . and far into the reaches of space. And the same years have seen CMC expand far beyond the limitations that confined it at the turn of the century. Steady growth combined with flexibility and resourcefulness has enabled the Company to adapt to the rapid changes of this modern age in order to serve many of the communication and navigation needs of industry and government around the globe.

From its inception, CMC operated a wireless station at Glace Bay, to form the first transatlantic radio link with Europe and, in 1904, to establish wireless communication with ships at sea. First constructed at Table Head this station was moved, in 1905, to a larger site nearer Port Morien. The consistent pattern of success by CMC in the field of design, manufacture and installation of marine communications dates back to that early period of practical operating experience. During this same period, an agreement with the Marconi's Wireless Telegraph Company Ltd., in England, acquired for CMC, rights in Canada and Newfoundland for all Marconi patents.

In order to maintain the equipment in those early installations, the Company, in 1907, began to manufacture replacement parts in a small repair and machine depot in Glace Bay. By 1912, in Montreal, CMC was manufacturing most of its own equipment, including switchboards and complete wireless equipment. Also in 1912, the company installed the first four wireless radio-telegraph stations to serve shipping in the Great Lakes, and, in 1913 the company pioneered high speed transatlantic wireless telegraph transmission.

World War I added tremendous impetus to the development of radio communications and the demand for marine installations was so great that CMC was forced to move operations to much larger quarters on William Street, Montreal.

Immediately following the war, in 1919, broadcasting of the human voice and music first started in Canada with test programs originated by CMC from its premises on William Street, on a wavelength of 1200 metres, and using the call sign XWA. The first programs consisted of gramophone records, news items and weather reports. This important development created deep public interest although the impact and influence it was to effect on our daily lives was not realized at the time. An entirely new concept in home entertainment had arrived and later a new dimension was added to the field of advertising. The advent of radio also created new fields of activity for CMC in the manufacture of both receiving and transmitting apparatus. The Company moved to its present location in 1930 — with large

extensions to the original building being made at frequent intervals — including the time of writing. In 1921, Canadian Marconi Company manufactured the first radio receivers in Canada; then, in 1922 it set up station VAS with medium frequency, high power, continuous wave transmitters at Glace Bay and a receiving station at Louisbourg, Cape Breton, which permitted it to offer shipping companies a duplex automatic high-speed service up to two thousand miles off-shore; also in 1922, began the manufacture of the first marine direction-finding equipment; in 1926 the erection and equipment of new high-speed beam service facilities, and the start of communications with similarly equipped stations in the United Kingdom and in 1928 this service was extended to include Australia and the U.S.A.; also in 1928 the Company began the manufacture of broadcast receiver components, radio beacon equipment designed for navigational use; and in 1930, the installation of short-wave wireless facilities at the Glace Bay station for service to ships at sea. Out from the Atlantic coast, Glace Bay became a reassuring beacon and a by-word for guidance and cheer, and during the dark days of World War II it served as one of the most vital links in the communications of free world shipping and the war at sea. In 1932 direct telephone service with Great Britain was carried out by the Company who provided the Trans-Atlantic Link for the Bell Telephone Company on this side and the British Post Office on the other side. In 1939 during the Royal visit, the Company installed a photogram service between Montreal and London for the transmission of pictures by radio. This service was extended to Australia the following year. Throughout World War II, CMC geared all its resources and efforts to the vital task of designing and manufacturing the complicated electronic and communications equipment required by the armed forces. Those electronic inventions, which would have matured slowly in peacetime, now, seemingly, mushroomed almost overnight during the crisis. With the end of the war, CMC adapted wartime discoveries to the service of peaceful ends and by 1948 it was heavily engaged in the production of commercial radar for the

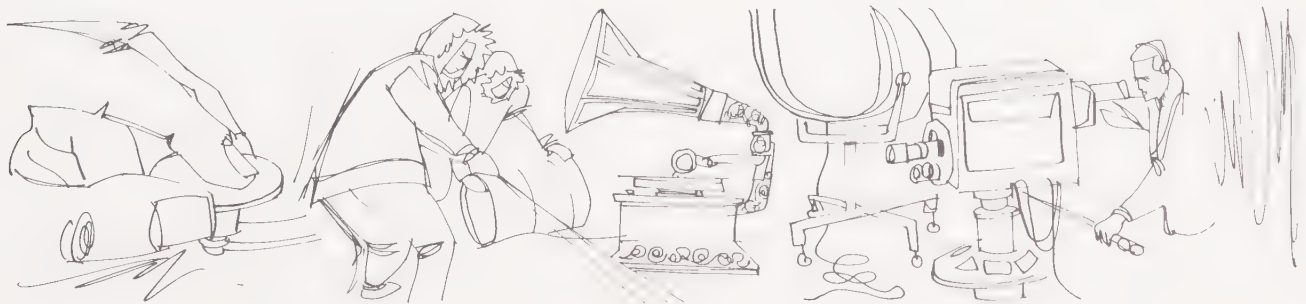
shipping industry. Today, the tremendous scope and complexity of electronic products designed and produced by CMC is one of its most highly valued corporate credentials.

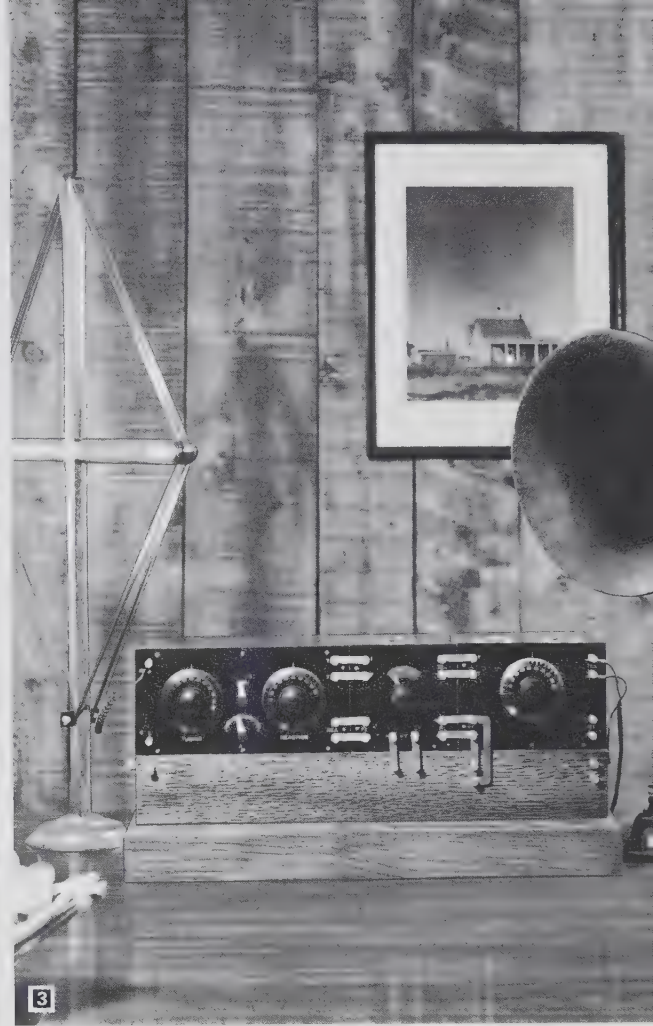
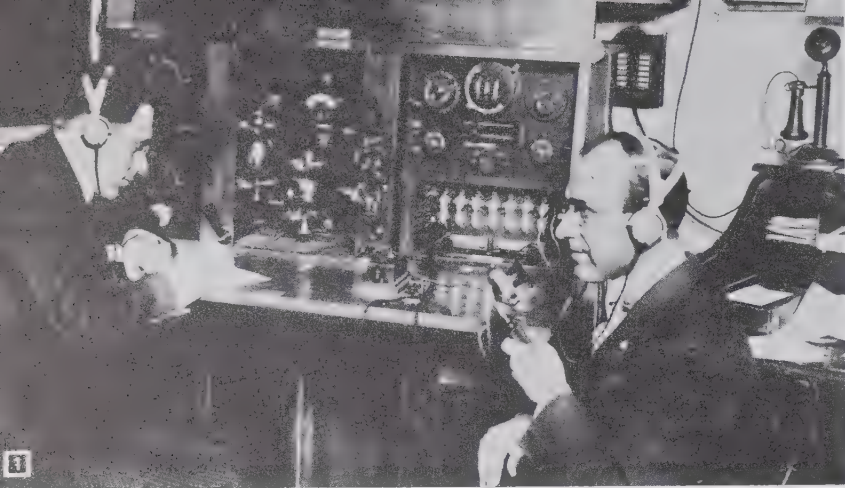
In 1952, Canadian Marconi Company, deeply involved in the radar defence networks of the North American continent, consolidated the construction, installation, operation and maintenance facilities into the Special Services Division (SSD). This division, employing some 1,000 persons, has constructed complete defence sites and it has installed, and still maintains and operates, communication and radar equipment for many of Canada's northern defence projects.

In 1953, The English Electric Company Limited acquired the majority shareholding (50.6%) in Canadian Marconi Company. The original Marconi's Wireless Telegraph Co., Ltd., England — now known as The Marconi Company Limited — had earlier become a subsidiary of the English Electric Company Limited. This association with the English Electric Group of Companies has provided CMC with added depth of technical resources.

First in Canada to operate microwave radio relay in 1947, the Company undertook the very important task of designing, manufacturing and installing the complete microwave system for Canada's "Mid-Canada Defence Line" in 1956. This and other vital multi-channel communication equipment which CMC has manufactured, delivered and installed is kept up to the most modern standard of efficiency by the application of recent advances by the company in this highly specialized field. Similar equipment of higher channel capacity has been produced for commercial purposes and is now in service both in Canada and abroad.

Perhaps the most spectacular of recent CMC advances was the introduction in 1957, of an original technique — FM-CW Doppler sensors. CMC's Doppler navigation equipment operates completely independently of ground stations. Impressive testimonial to the great benefits inherent in the CMC Doppler system is the fact that many of the world's leading airlines, including Canadian Pacific, World Airways, Air France, KLM, Varig, Alitalia, Irish International Airlines, TAI and South African Airways now use it.





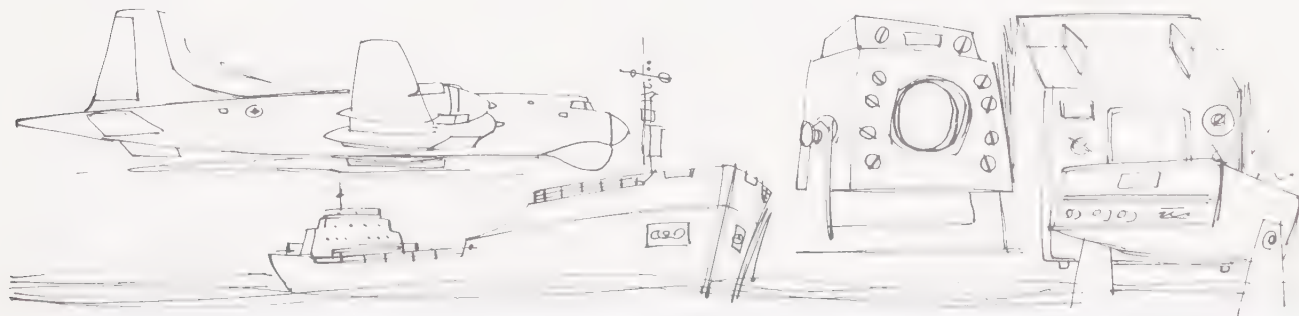
Military versions of CMC Doppler Navigation equipment have been developed and are in use by the Air Forces of Canada, and other nations.

1960 saw CMC's broadcasting activities take on new and much greater significance as a result of the recommendation by the Board of Broadcast Governors that CMC be granted a license to operate an English language television station in Montreal. The recommendation was accepted by the Government and, by this fact, one of the most important single developments in CMC history was achieved. On January 20th, 1961, CFCF-TV, Channel 12 in Montreal, commenced broadcasting and today it is consistently audience-rated as being one of the two top English TV stations in Canada. In early 1962, the Marine and Land Communication Division was formed to serve the market for mobile and marine equipment, point-to-point systems and broadcast station equipment. This highly interesting area of CMC activity enjoys the confidence of a wide and diverse market for products which have made Canadian Marconi and Quality synonymous.

In 1965 Canadian Marconi bought the assets of a company in California, renamed it Kaar Electronics Corporation and is using that organization to accelerate penetration of the United States market. Kaar is an extension of the Marine & Land Communications Division and its coverage includes a manufacturing plant at Ukiah,

California and sales and service offices at Portland, Maine; Rahway, New Jersey; Waltham, Massachusetts; New Orleans, Louisiana; St. Louis, Missouri; and Mountain View, California.

For over forty years the Company was an important participant in the home entertainment field in Canada. It was a pioneer in the manufacture and sale of radio receivers for home use and many thousands of Canadian homes are equipped with Canadian Marconi radio and television receivers and record players. In addition, much of the transmitting equipment used by the radio and television stations of the country bears the label — Marconi. Early in 1966; however, the Company ceased this activity in order to concentrate its resources on the more sophisticated products with which it has been so successful at home and abroad. Record sales in recent years is dramatic proof that CMC policy, personnel and products are equal to the challenges of the Electronic Age. As in the past, progress is a commodity at CMC and a large measure of this progress is due to the continuing demand for the Company's products in the export market. All operating divisions of the company have steadily increased their share of market, and CMC looks to the future with full confidence that its quality of people and products will serve an ever-expanding market.



1 Canadian Marconi Company was, in 1919, first in the Americas to establish regularly programmed radio broadcasting. This station XWA, now CFCF, pioneered what were among the first regular broadcast programs anywhere in the world, from its early studio on William Street in Montreal.

2 Marconi (third from left) visits Glace Bay, N.S., in 1903. Icicle-laden wires in background lead to the antenna of the first station for commercial transatlantic wireless telegraphy.

3 The year 1922 saw CMC manufacture the first tube radio (Marconi model "C") in Canada. At that time, the operator used an earphone head-set. However by 1923 the horn-speaker along with the crude loop antenna was introduced.

4 Canadian Marconi Company was first to construct and operate a wireless station at Table Head, Glace Bay, Nova Scotia. This station formed the first transatlantic radio link with Europe. In 1905, it was moved to a larger site at Morien, Glace Bay.

BROADCASTING DIVISION

Canadian Marconi Company Broadcasting Centre ... home of CFCF-TV, CFCF-AM, CFQR-FM and CFCX Shortwave.



FIVE DECADES OF SERVICE

In 1919, Canadian Marconi Company first broadcast the sound of the human voice, to Canadian households, but few were equipped to hear this then incredible achievement. Within a year, however, public interest became such that the Montreal "Star" began regularly to publish program schedules. By 1922, when the original call letters XWA became the now-familiar CFCF, downtown theatre-goers were being entertained, between movies, by the sound of CFCF radio. On July 1, 1927, Canada celebrated her 60th Anniversary, the Diamond Jubilee of Confederation, and it was through the facilities of CFCF that many Montrealers heard the bells of the carillon ring out for the first time from the Peace Tower on the Parliament Buildings in the Nation's capital. On the same occasion, the voice of Prime Minister Mackenzie King was heard as he addressed the Country. In 1930, Canadian Marconi Company set up a shortwave broadcast operation in Drummondville, Quebec. Two years later, it was moved to Montreal, where in 1936, it became CFCX. The station became inactive in 1949, but it returned to the air in 1963, and now operates from the AM transmitter building in Caughnawaga, near Montreal, which incidentally, is one of Canada's few remaining Indian villages. CFCF expanded to FM broadcasting in 1947, then, in 1963 moved its FM transmitter to a point high on Montreal's most prominent landmark, Mount Royal, and its signal strength was increased to 41 kilowatts. CFCF-AM operates at 600 kilocycles with a power of 5,000 watts and is part of the daily lives of one of the largest and most influential audiences in the Country. CFQR-FM operates at 92.5 megacycles with a power output of 41,500 ERP, and it caters to the listening pleasure of a growing and discriminating listening group. CFCX shortwave at 6005 kilocycles and a power of 500 watts broadcasts a signal largely oriented north-to-south, and listener response is received from the Caribbean to the Arctic.

On January 20, 1961, Canadian Marconi Company passed yet another significant milestone, the opening of a new television station, CFCF-TV, on Channel 12, in Montreal. For several months, CFCF-TV offered full programming from temporary headquarters. Later in 1961, it was moved into a new ultra-modern and fully integrated Broadcast Centre, designed to become, by 1963, the home of CFCF-TV and radio stations CFCF-AM, CFQR-FM and CFCX shortwave.

In 1963, changes within the organisational structure of the Broadcasting Division saw the formation of

Combined Services. Under this concept, the Engineering, News, Sports, Promotion, Continuity, Art and Accounting Departments pool their skills and resources to provide the best possible services to CFCF Radio and CFCF Television and as a consequence, the public.

Since the first Canadian Marconi broadcasts sent eager listeners scurrying to their primitive crystal sets, CFCF through its radio and television facilities has continued to provide a balanced schedule of information, entertainment and community-minded programming. Just as the city comprises many and varied elements, CFCF Radio and CFCF-TV seek constantly to provide programs rich in regional interest, in world affairs and in public service. News, public and civic affairs, arts, education, sports, programs for women and children, all these are part of the CFCF listening and viewing schedule.

Staff cameramen, local and foreign reporters, film editors and top announcers all contribute to the quality of CFCF's up-to-the-minute coverage on radio and television of local, national and international news. In addition radio and TV mobile units, marine services and its helicopter are "on alert" for immediate coverage of any major news event. As well as its 31 regular weekly television newscasts and on the hour and intermittent half-hour radio newscasts CFCF also provides special news bulletins and programs when world events so dictate. Indicative of the quality of the CFCF news organization is the fact that in 1964 CFCF was awarded a coveted Beaver Award by the Canadian Broadcaster "for evolving its new news concept designed to meet the public's growing demand for up to the minute information on current affairs, making news its prime product". CFCF-TV, Channel 12, is also a major contributor to the CTV network National news. CFCF-TV plays an important and dedicated role in public service programming and devotes a significant percentage of air time to groups offering community services. CFCF's Community Service record is, in itself, a proud chapter in the Company's history. Since inaugurating the Tiny Tim Fund for the Out-Patients of the Montreal Children's Hospital, CFCF has raised more than half-a-million dollars for the care and welfare of these children. Channel 12 has produced many special programs in aid of worthy charities. For example, viewers have participated in 4-hour TV auctions

on behalf of the Crippled and Handicapped Children, watched and contributed \$160,000.00 during an all-night telethon to aid victims of a disaster in suburban Lasalle, and enjoyed the 90 minute Tiny Tim Christmas Party.

CFCF-TV studios and creative staff provide the most up-to-date facilities and techniques in color and black and white for program and commercial production. Two 50' x 70' studios, and a third 21' x 35' are serviced with the latest model Marconi cameras including the highly regarded Marconi Mark VII color cameras, telecine chains, videotape recorders, videotape editing unit, audio recording facilities, full studio crew and highly qualified creative personnel. The control rooms feature the latest equipment, including effects generators providing a total of 50 special effects. Property and carpentry shops provide props and settings for any program or commercial production. Film editing facilities and photography labs are equipped and staffed to meet the requirements of any production. In one of the two larger studios is a 206-seat amphitheatre to accommodate a "live" audience. As well, both of the large studios can seat an additional 200 people in special bleachers on the studio floor. CFCF-TV facilities also include two complete mobile units: a one camera VTR unit with videotape recorder, studio console and its own power supply, and a complete multi-camera control room-on-wheels which is ready to roll to any location. With these mobile facilities, CFCF-TV originates local programs and special network originations such as Canadian Pro Football telecasts and NHL hockey.

CFCF-TV has become a major production house for both local and American advertisers and their agencies. It is also a major videotape commercial production house with its own local and national sales force. In the Channel 12 studios, selling messages have been produced for such well known national advertisers as: Proctor & Gamble, Colgate Palmolive, General Motors, Lowney's, Robin Hood, Playtex, Polaroid, Coorsh, Aqua Velva, Geritol, Dow, Molsons, Texaco, and DuPont of Canada. Many of these commercials were produced in both English and French.

Effective September 1st, 1966 which was the date set by Government regulation, CFCF-TV began telecasting in color and a growing proportion of its total program service is in color.





1 CFCF Radio newsman on location, bringing Montrealers first-hand coverage of a local story.

2 Jack Dempsey being interviewed at CFCF, in 1922, Canada's first commercial radio studio.

3 CFCF-TV mobile unit on location at Montreal's International Airport, video taping a commercial.

The mobile is also a familiar sight to Montrealers at various sports and news events.

4 CFCF-TV produced "Musical Showcase", sponsored by BA Oil Company and seen across Canada on CTV television network.

5 Started by CFCF Radio in 1951, the Tiny Tim Fund of the Montreal

Children's Hospital has become a full-fledged Broadcasting Division campaign. Here, CF Radio and TV personalities entertain hospitalized youngsters.

6 A large staff of on-air personalities entertain and inform the radio audiences.

7 CFCF-radio teen personality Dave Boxer pictured with the international recording stars the Dave Clark Five.

8 Election coverage . . . From CFCF-TV Channel 12, Montrealers view up-to-the-minute federal and provincial election results.

COMMERCIAL PRODUCTS DIVISION

The Commercial Products Division is responsible for the design, development, manufacture, marketing and after-sales service of avionics and telecommunications equipment for commercial and military uses. The Division is comprised of three Departments, Avionics and Telecommunications, each staffed with a highly competent team of engineers and each sharing the facilities of the Manufacturing Department. The heads of these three departments report to the Division Vice-President.

An RCN Sea King completes a sounding mission. The Sea King employs a CMC Doppler navigation system.



AVIONICS DEPARTMENT

The original Aviation Department of CMC was formed in 1952, and since that time the company has gained a world-wide reputation for the development and manufacture of highly sophisticated airborne electronic equipment.

At the beginning, a relatively simple HF communications set, an advanced — for its time — automatic direction finder, and some smaller accessories were the first items to be produced. During the early years, familiarity with international civil and military markets was gained and this invaluable knowledge is, today, an important asset of the company.

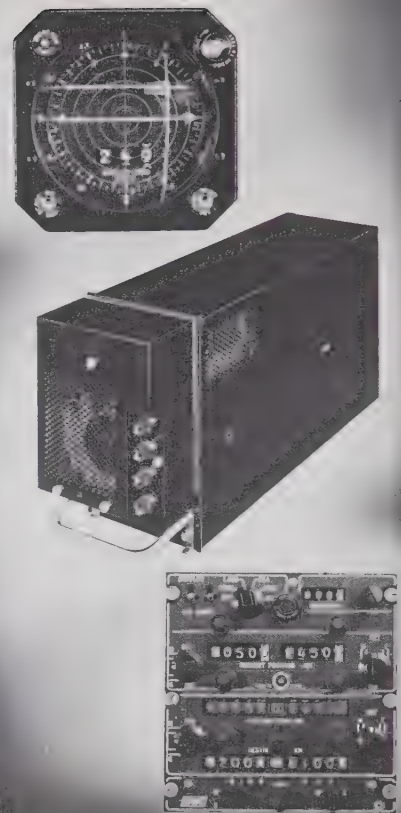
Early achievements were modest but significant, and an indication of the widespread acceptance of CMC's first products is gained from the following partial list of customers for these items: Lufthansa, South African Airways, Continental Airlines, Viacao Aerea Sao Paulo, Pakistan International Airlines and Central African Airlines. Complex as conditions were for the Company's entry into the world's aviation circles, developments were in motion which would set the stage for the introduction and highly successful marketing of an item which established the Canadian Marconi name in the forefront of the industry. This most significant point in progress was reached when CPD developed an entirely new technique for application in navigation systems. This was the airborne Doppler sensor employing FM-CW techniques providing groundspeed and drift angle information to a very high standard of accuracy. The possibilities of this new system were immediately recognized and the first prototype units were soon on loan to airlines for evaluation under operational conditions. As a result of trial performance standards achieved, orders were placed by Air France, KLM and other major airlines of the world from countries as far apart as Eire — where Irish International Airlines specified dual installations in its jet fleet — to South America, where the Brazilian carrier Viacao Aerea Rio Grandense has fitted CMC

Doppler to its Boeing 707 fleet. Among other leading airline users are: Canadian Pacific, Alitalia, UTA and South African Airways.

The Royal Canadian Air Force was one of the first users of a military version of CMC Doppler equipment and has installed it in many different transport and anti-submarine warfare aircraft. A considerable number of units has been delivered to the United States Air Force which has specified CMC Doppler as standard throughout the MATS fleet and it continues to find new applications.

A logical sequel to the Doppler sensor units was the development of a navigational computer to form part of an integrated system. This unit provides continuous and direct advice as to how closely the flight plan is being adhered to. The planned course in successive sections ("legs") is set up on the instrument and, as the flight proceeds, a continuous display shows distance of the aircraft "across track" and distance to go to the end of "leg" being flown. As each "leg" is completed, the instrument switches or is switched to the next. The navigator is continuously presented with current information and is thereby relieved of the necessity for a succession of involved calculations. Furthermore, the unit can be coupled to the automatic pilot to provide automatic control of the aircraft during flight.

CMC's decision to design and manufacture navigation computers was made in order to take advantage of the highly accurate output of the Doppler sensor. Since computer development began several years ago, the field has expanded so extensively that it now constitutes a major product area in itself. The use of special purpose navigation computers now provides aircraft with facilities which permit flexible and precise flight patterns. From the original along-cross track computer various tactical computers have been developed which determine position in latitude and longitude with respect to a multiplicity of selectable destinations.



The original vacuum tube version of the Doppler sensor, as used in conventional transport aircraft, has been succeeded by a new series of transistorized equipment which are basically similar and known as the "general purpose system". Various versions of this system permit it to be used in all current fixed wing and rotary wing aircraft. Military Agencies which may operate many kinds of aircraft in either or both these categories are assured of significant economies because of the common or closely related basic units, test equipment, technical literature, training facilities and other logistic considerations.

For some years past, the outstanding performance of Canadian Marconi Doppler navigation systems has won the respect and acceptance of many countries of the Free World for use in both military and commercial aircraft. Much of the credit for this accomplishment

belongs to Mr. K. C. M. Gregg, formerly Chief Engineer and now Avionics Department General Manager of the Commercial Products Division, who led the excellent engineering development team which advanced the state of the art in this field. In 1964 Mr. Gregg was honoured by the presentation to him of the McCurdy Award, which is given annually for outstanding contribution in the scientific and engineering fields of aeronautics and space by the Canadian Aeronautics and Space Institute.

With a continuing program of development, Canadian Marconi Company intends to ensure its position as a world leader in the aviation field with further achievements bearing the quality stamp — CMC.

Aviation products of The Marconi Company Limited of England, and those of NARCO in the U.S.A. are also made available in Canada through CMC.

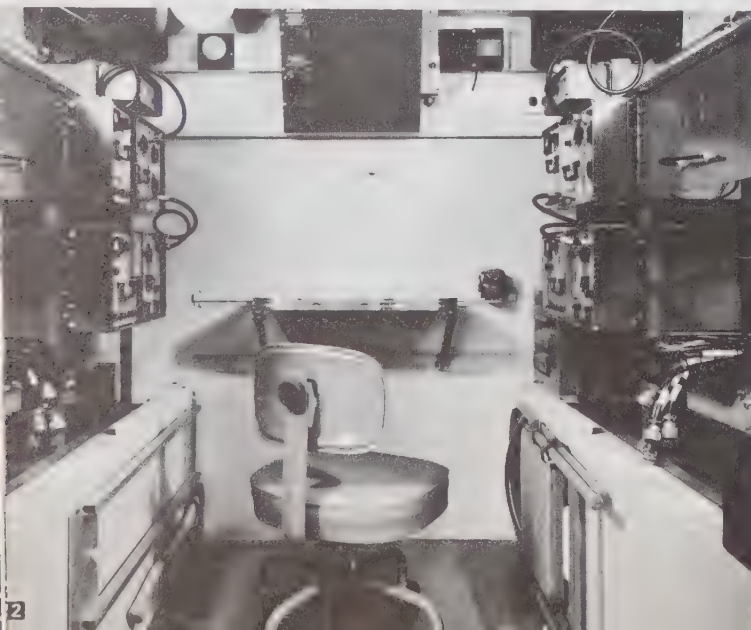


1 Canadian Marconi Airborne Doppler Navigation System . . . The specified standard throughout many of the world's leading international air fleets.

2 Commercial Products Division Doppler Navigation Systems have won the respect and acceptance of many countries of the free world for use in both military and commercial aircraft.

3 A "clean room", where precision mechanical assembly of avionics and telecommunications equipment takes place.

4 A proud day in the history of Canadian Marconi as K. C. M. Gregg (r) formerly Chief Engineer, Commercial Products Division, receives the McCurdy Award from C.A.S.I. President, D. R. Taylor.



TELECOMMUNICATIONS DEPARTMENT

Canadian Marconi has long been linked with numerous development firsts in radio communications. Among its noted successes has been its works in microwave radio relay, much of which has been carried out by the Commercial Products Division. Increasing activity, within the Division, together with a new product breakthrough initiated the formation of an additional product organization, designated Telecommunications. This Department is responsible for the development and marketing of highly sophisticated communications equipment as well as the export marketing (not including the United States) of products manufactured by the Marine and Land Communications Division.

The Telecommunications Department possesses a substantial development engineering group and a systems engineering group and provides sales, installation and field service throughout the world, with agents in over forty-seven countries, as well as permanent CMC sales representatives in selected territories.

This organization of specialist resource, applicable to communications problems and equipment, has been instrumental in the development of state-of-the-art equipment in the most exacting of design areas and has concentrated a major portion of its efforts in the field of microwave radio relay equipment.

CMC radio relay systems provide vital communications in major military and commercial systems in Canada, meeting the most exacting performance requirements. CMC equipment carries voice communications and television signals through the jungles of South America and across the wide reaches of Australia. In Venezuela CMC equipment carries the main communication channels and television signals to the great oil centre of Maracaibo over a system containing the longest line-of-sight path in operation in the world. Operating between mountain peaks, this path covers a distance

of 184 miles, giving high quality performance in spite of the distances involved.

The Telecommunications Department has recently completed a major development in the design of a very advanced tactical radio relay equipment designated the AN/GRC-103. The equipment is intended to carry up to 60 voice channels in tactical field situations, and is designed to accommodate the latest 12-24 Channel PCM multiplex now coming into field application by military users. This equipment features very small size, great ease and simplicity of operation and maintenance, and an extremely high order of reliability. To illustrate the convenience and ease of operation, an entire terminal station can be readily placed in operation under field conditions by two men in less than fifteen minutes. This includes the erection and alignment of the companion portable mast and antenna system.

This equipment has met with great interest and response by military communications authorities in many countries, and represents one of the major achievements of the development team of the Telecommunications Department.

The Telecommunications Department also provides the sales, installation and service organization responsible for the export of high frequency and very high frequency communications equipment, produced by the Company's Marine and Land Communications Division. The export group lists among its satisfied customers the Police Departments of Jamaica and Trinidad; the Power Companies in Taiwan, Bolivia, Costa Rica and Nigeria; the Post and Telegraph Department in Thailand; Air Ceylon; Cable and Wireless in Hong Kong; Alcan in Jamaica and British Guiana; the Governments of Barbados, Malaysia, Costa Rica and Uruguay; the Nitrate Sales Corporation in Chile; Oil Companies in Trinidad and many others.

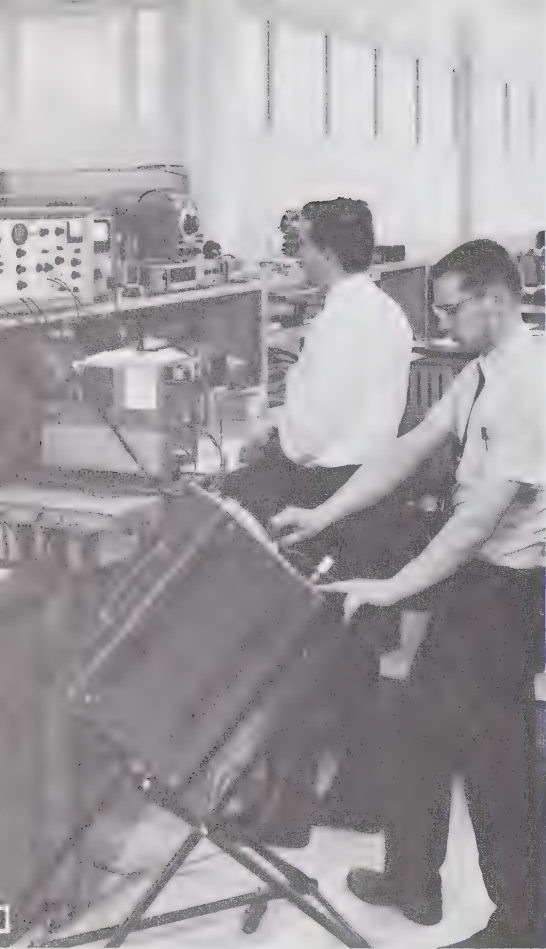
1 Convenient and easy to operate the CMC advanced tactical radio relay station can be readily placed in operation under field conditions by two men in less than fifteen minutes. Illustration

two shows the installation as it appears in a three-quarter ton vehicle.

3 A typical microwave antenna designed and installed by CPD.

4 The DT75 and CH25 are two current export items of high and very high frequency communications equipment used for mobile and point-to-point requirements.

5 H.M.C.S. Saskatchewan, heads for open water. Canadian Marconi HF transmitters play an important part in Royal Canadian Navy Communications.



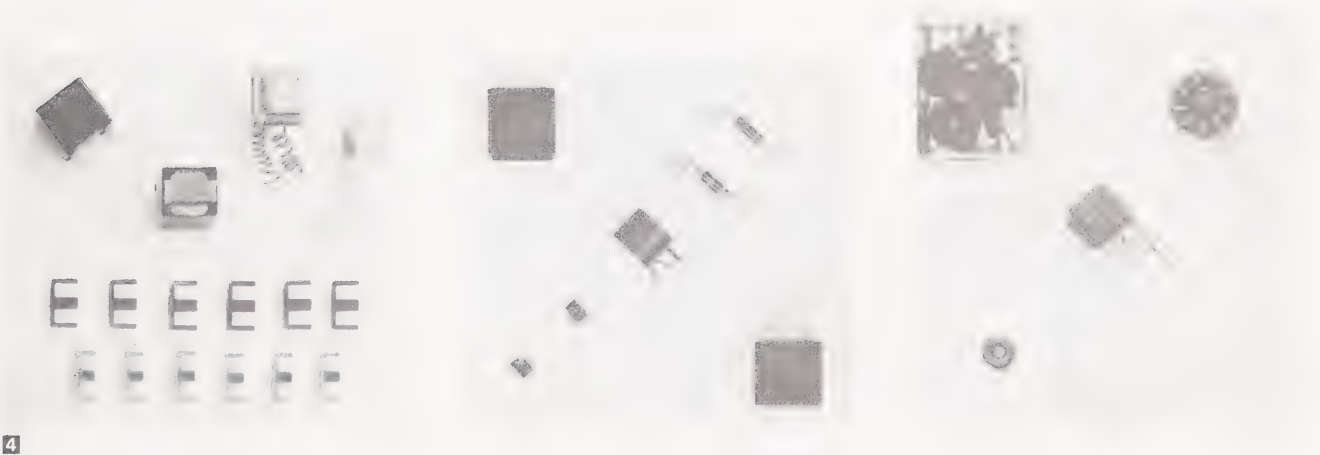
CPD ENGINEERING

To become, and remain, a leader in the Avionics and Telecommunications fields requires a top flight engineering staff. Such a staff has been assembled over a period of years by the Company's Commercial Products Division; in fact CPD has one of the best design and development engineering teams in the North American electronics industry. Due to the great amount of freedom enjoyed by our engineers, the resulting low turnover in personnel ensures continuity of effort and accumulation of "know-how". For example, a good number of this staff have ten years or more of continuous service with a major number serving five years and upward, some being involved in Doppler navigation development since its inception at CMC in 1957.

To produce complex and unique equipments, as CPD does, requires a largely self-sufficient operation. Consequently the total engineering effort encompasses, in addition to the development of prime equipment, the design and manufacture of special components and special test equipment, continuous

and comprehensive component reliability studies, installation and proving tests of new equipment, the improvement of existing products, the design and manufacture of custom hybrid microcircuits. It is worth noting that CPD has complete in-house microcircuit facilities, using the latest thin film and multiple chip techniques. The fact that these facilities are in-house results in a high level of quality control, and allows fast implementation of circuit design changes. Complete bench, flight, and environmental test, and drafting and model shop facilities are available to engineering. The flight test facilities include both fixed and rotary wing aircraft. Environmental test facilities satisfy all military requirements and include the installation of test chambers to the standard required by the Advisory Group on Reliability of Electronic Equipment.

The avionics and telecommunications equipment produced by CPD ranks with the best in the world. The engineering staff has the leadership, the talent, and the facilities to assure this continued position.



1 The Department's development capability is contained in three main Groups, each specializing in a particular field with emphasis on creative thinking.

2 The Commercial Products Division Micro-Electronics Laboratory has developed techniques for the manufacture of hermetically sealed silicon chip Micro-Circuits and thin film Hybrid Circuits.

3 The Mechanical Design Group consists of seven sections and is responsible for all drafting and for the production of development and prototype models.

4 AF coupling transformers, high pass filters, toroidal coils and AF filters, are typical of many miniaturized components manufactured by the CPD Components and Reliability Group.

MARINE & LAND COMMUNICATIONS DIVISION

The Marine & Land Communications Division (M&LCD) was formed to serve the market need for mobile and marine equipments, point-to-point systems and electronic test and industrial control instruments. This is a highly interesting area of Company activity that enjoys the advantage of a large member of customers in widely different kinds of business. In Canada CMC is the leader in the marine field and is the only Canadian Company with a complete line of marine radio communication and navigation gear.

Mobile communication between vehicles or between vehicles and central despatching is another field long-served by CMC. Here, Company engineers have made a number of "break throughs" in the development of new techniques. With significant progress being made both technically and commercially the list of customers grows in numbers as well as distinction.

Single sideband (SSB) point-to-point communications is the "bridge" for many industrial enterprises whose field-work in remote areas demand instant contact with their headquarters. An example of this is an oil company with its offices in Calgary and its exploration crew on Cornwallis Island, well within the Arctic Circle and some 2,500 miles distant.

The Electronics Instruments section supplies a very broad range of instruments and test equipment very necessary to both the electronics industry and other industries where electronic controls are the requirement of modern operating methods.

A grouping of marine and land communications equipment.



CMC is eminently qualified to discuss and deal with all aspects of the radio communications field. The company possesses a vast reservoir of knowledge and it has excellent research, development and manufacturing facilities. Systems engineering groups are available for dealing with problems in high frequency FM transmission. With the existence of a systems group, in the conventional communication area, CMC is able to provide all types of radio services. This group deals with spectrum searches, planning, briefs and installations, or adaptations of existing communications systems. Systems engineering in communications, usually means the selection, and subsequent combination, of existing parts to form an information carrying circuit with a specified percentage of reliability. Communication system design requires a complete understanding of exactly what the system is required to do, a thorough knowledge of propagation phenomena, and familiarity with government regulations, together with communication equipments' characteristics and availability.

The M & LCD Engineering Department keeps right up-to-the-minute with design improvements and new specifications requirements. Every piece of CMC communications equipment conforms to the Radio Standards Specifications as laid down by the Canadian Government regulating body, Department of Transport, as well as the Federal Communications Commission in the United States.

MARINE COMMUNICATION AND NAVIGATION SYSTEMS

Soon after Marconi's successful early work his name

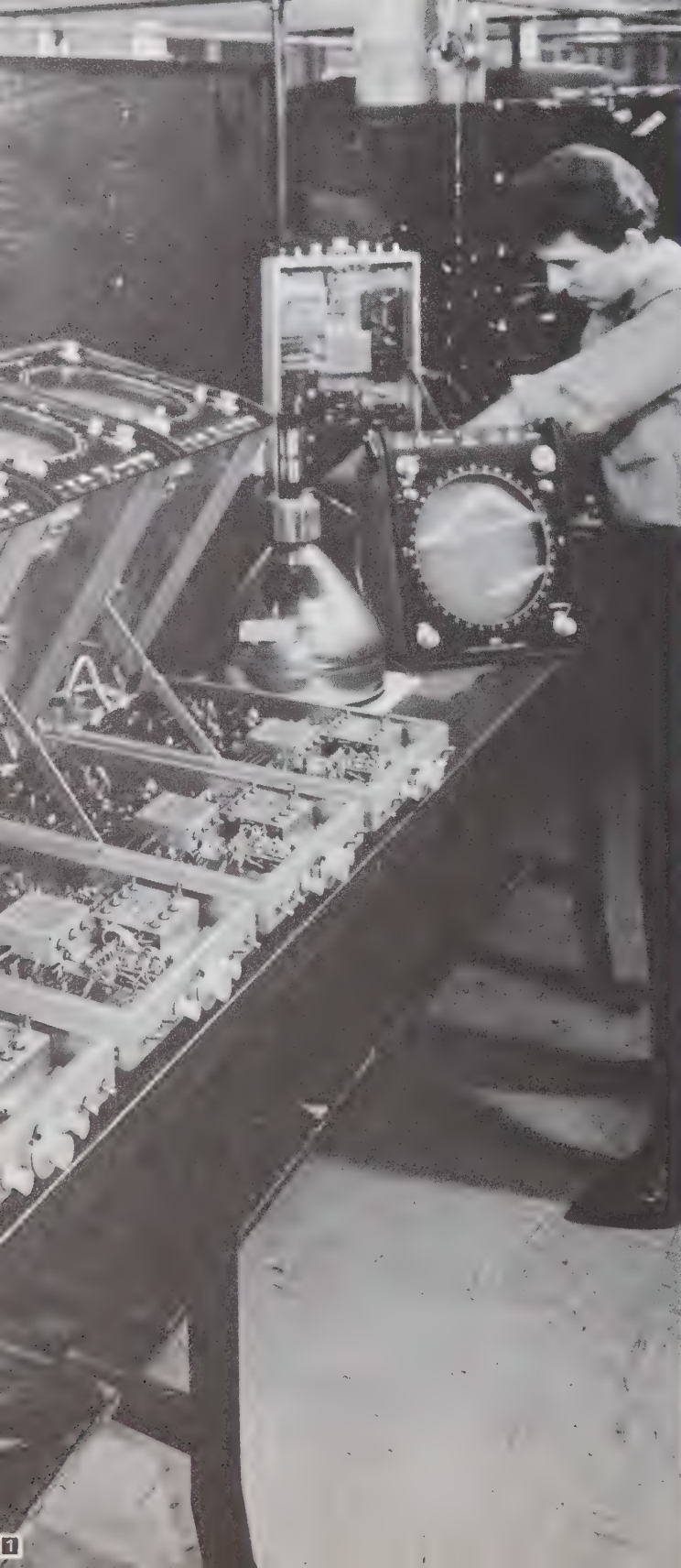
became synonymous with marine communications. For many years, throughout the world, wireless operators on board ships were referred to as "Marconi". Eventually this term gave way to the now familiar nickname "Sparks". While the terms have changed and today's systems no longer resemble, even remotely, the early marine communications equipments — Marconi is still a revered name among seafaring men of all maritime nations.

While in the early years Canadian Marconi Company facilities served as an overseas communications link between Europe and North America the Company was also becoming a major contributor to safe and economical traffic on the high seas. Today CMC Marine & Land Communications Division carries on this tradition, manufacturing and installing equipment to meet the requirements of all classes and types of vessels. Reliability and product efficiency has led to the wide acceptance of its maritime equipments. For more than fifty years this company has never relinquished its position, in Canada, as the leader in this field.

CMC maintains a nation-wide network of service depots in Canada and in the U.S.A. These are strategically located to provide fast, efficient service. Each depot is fully staffed and equipped to handle all radio communications needs — both land and marine.

The company has specialized in the design of multi-channel equipment for shipborne use from the time suitable frequencies were assigned to the VHF-FM marine service.





The evolution in design technique and the state of the art has reduced the size and complexity of these equipments, from the earlier two receiver unit for simultaneous monitoring of navigational and public correspondence channels with selective ringer to the latest compact multichannel equipment capable of communicating on any frequency in the International Maritime Mobile Band including public correspondence. Monitor receivers and selective ringers complement the selection of VHF-FM multichannel maritime mobile radio equipment. The equipment will accommodate up to 12 frequencies in the International Maritime Mobile Service including public correspondence channels, and deliver 25 watts of RF output power. All equipments can be supplied for operation on 12, 24, 32, 110 VDC and 115 VAC. In the medium frequency/high frequency Maritime frequency range, M&LCD has a complete line of multi-channel, transistorized radiotelephones available for all voltages.

The Company has had nineteen years of marine radar design and manufacturing experience. This has led the way to its introduction of the first fully transistorized, medium power marine radar designed and produced in North America, in its Montreal plant. Designated LN55 and bearing the name Voyageur, this unit is intended to meet the demand for a reliable general purpose radar. The compact package and extremely low power requirement of the Voyageur makes it an attractive addition aboard pleasure craft, while extensive sea experience has proved this equipment outstanding in rough-weather conditions. The LN55 has a 10-inch display and a maximum range of 16 miles. Another unit available is the transistorized Raymarc; power output 20

KW; 7 closely spaced ranges covering distances from less than 20 yards to 48 miles.

Navigating Great Lakes and deep sea vessels requires that a ship's captain and its officers be in constant communication with the crew and advised of all navigation obstructions. The Marine & Land Communications Division, aside from its other marine products, offers ship owners a loudspeaker talk-back system for instant communication from the bridge to all vital parts of the ship and a closed circuit TV system which is of great assistance when manoeuvring giant bulk carriers in the tight quarters of a lock or canal. These great ships are so long that the bridge can be nearly seven hundred feet from the bow or stern of the vessel and having the "Eyes" of a TV camera at the distant point is of great assistance.

Simrad echo sounder and sonar equipment are available in Canada through CMC. Manufactured to exceptional engineering standards, with all screws and fittings of stainless steel, it is of striking significance that more than 10,000 units have been placed in service, in recent years. The service facilities of CMC have played a prominent role in achieving this result and it justifies the determined policy of ensuring a quality of service consistent with the quality of products. Six main groups of echo sounders range from models to record deepest ocean depths to waterproof types for open boats to units that detect schools of fish at varying depths and include a "White Line" capability to distinguish schools feeding on the ocean floor. Four groups of sonar models are available for any size of ships plus a special model for fisheries research.

1 The safety of life at sea is much increased by the Company's marine equipment; such as the Voyageur, a small-ship radar,

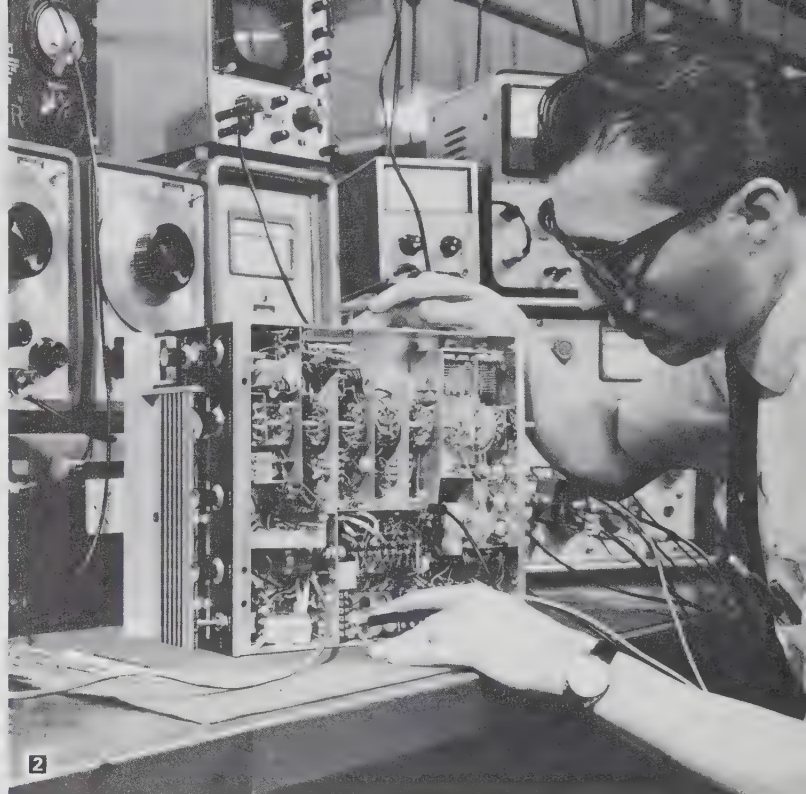
shown at the final assembly station.

2 Clipper II a twelve-channel VHF-FM marine radiotelephone,

demonstrated at the New York Boat Show.

3 Mohawk Navigation Co. Ltd. Bulk Carrier, "Silver Isle", navi-

gates in tight quarters, with the assistance of Canadian Marconi Company installed closed circuit TV Camera (encircled).



LAND AND MOBILE COMMUNICATION SYSTEMS

In addition to its maritime equipments, this Division handles a wide diversity of products, including land, point-to-point and mobile communications, designed and manufactured to the most rigid and demanding commercial specifications. Many of these products are designed, developed and manufactured by Canadian Marconi Company.

Advanced development engineering is the constant and vital heartbeat of M & LCD. One of the areas of achievement is HF transistorized single side-band equipment in the 2 to 15 MHz. frequency range. The new CH25 transistorized SSB Unit has 100 watt PEP, with six-channel capabilities, either simplex or semi-duplex. It is compatible with double sideband AM equipment and because of its size can be employed as a base station or a mobile or in a marine environment. The reliability and performance standards of VHF equipment produced by CMC has been well proven over the years in a vast number of installations. The introduction of the DT65 mobile radio and its associated central stations to the market ushered in a new dimension in standards of reliability. So reliable is the DT65 that Marconi offers a two-year warranty, the first such given to VHF mobile equipment manufactured by

any North American company. This fine equipment can be provided to operate on six channels. Other CMC developments have been the design of the DK65 railroad radio, which evolved from the DT65 and offers the same high performance and reliability factors, and a low cost mobile unit, the DT34, which was introduced just two years ago winning wide and immediate acceptance in the communications market. At present, several thousand DT34's are in service throughout Canada and the U.S.A. While these recent successes are testimonial to the Company's ability to produce competitive VHF equipment the ever changing market conditions demand constant development toward greater sophistication and efficiency. A recent example is the DT75 transistorized 2-way radio. This new and highly transistorized design reduces the size of equipment, battery drain and, at the same time, delivers improved performance and it is offered with a two-year warranty. CMC has designed, developed and manufactured a high reliability, medium cost line of tone-calling equipment, for use in mobile systems, capable of accommodating up to 182 individual codes. The tone calling devices utilize LC filters instead of conventional resonant reed relays, eliminating the inherent weakness of vibrator contacts.



1 In the West Indies, exploration for oil under the sea is an important economic development. Canadian Marconi Two-Way radio installations on offshore drill-rigs

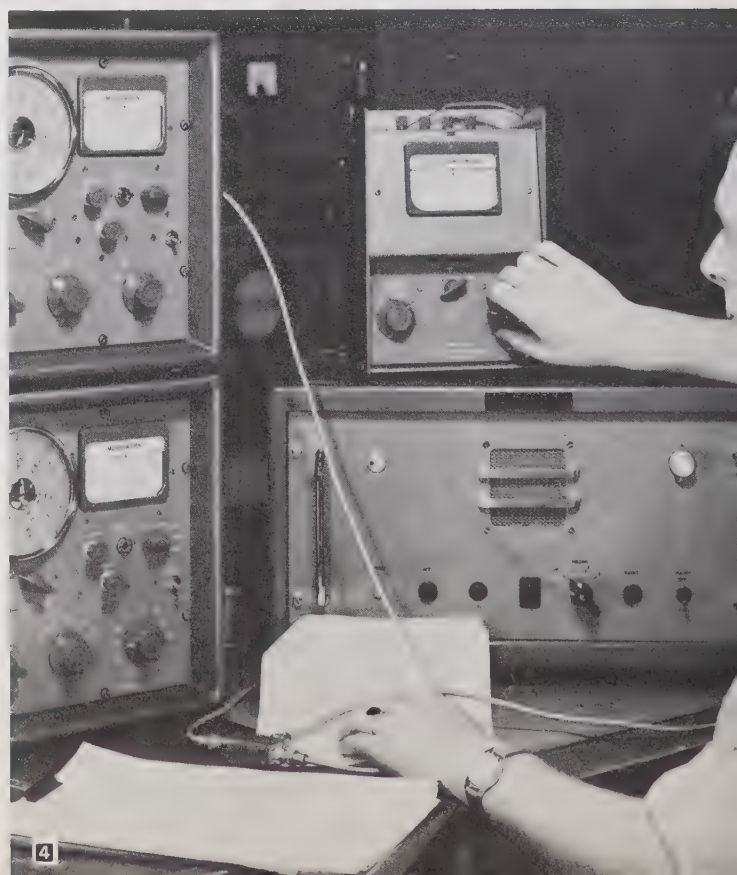
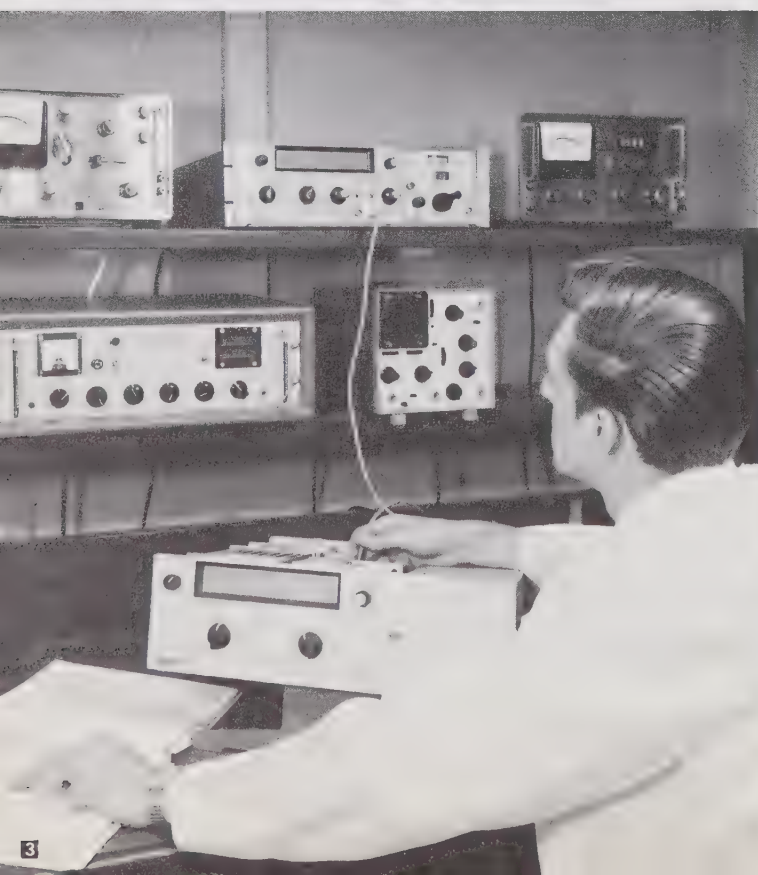
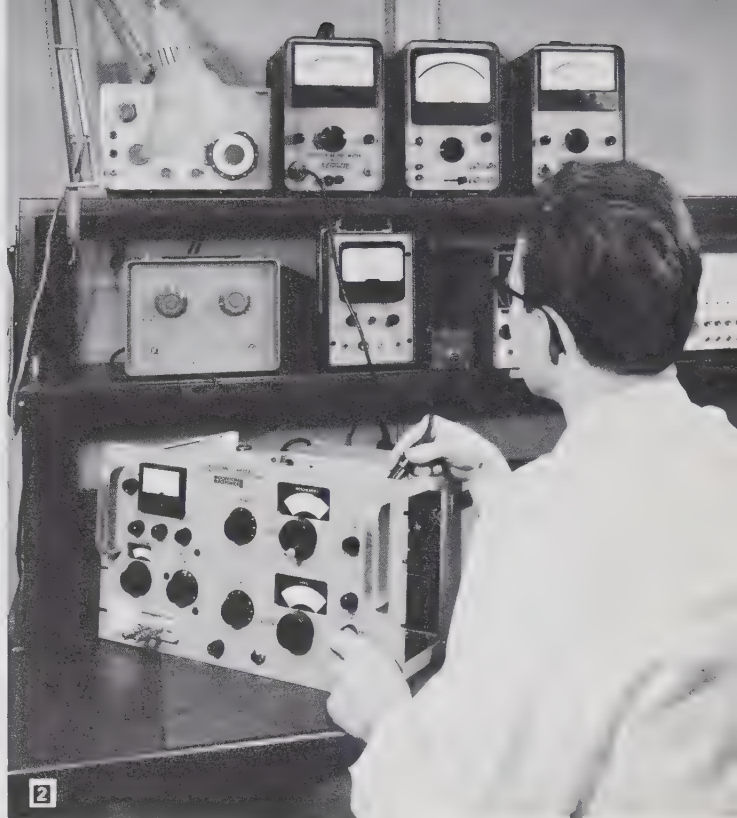
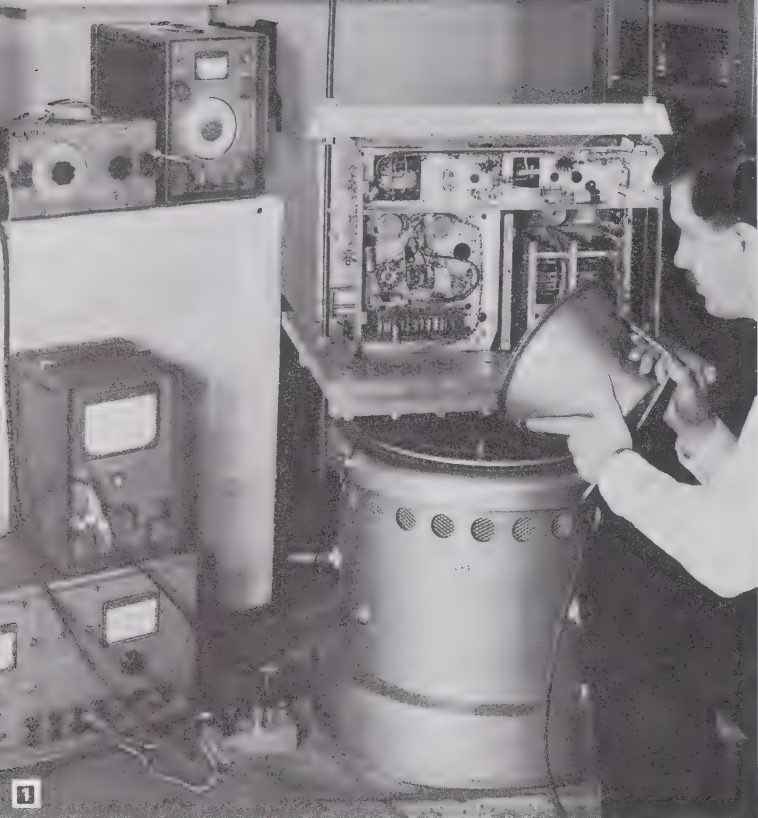
and in transport fleets give efficient, immediate contact with base.

2 Final production test of a CH25, 100 watt transmitter/receiver.

This unit can be employed as a base station or in a mobile/marine environment.

3 One of the mobile and marine assembly lines, through which

many thousand units have been manufactured for sale throughout the world.



ELECTRONIC INSTRUMENTS

The Electronic Instruments Section has filled a most important and valuable function in the field of electronics in Canada for many years. Its purpose is to supply and service the electronics industry with the highly precise test and laboratory instruments and equipment so necessary in this field. The Service Laboratory of the EI Section is located in Montreal, and it is completely equipped and staffed to enable calibration and repair to virtually any type of electronic test equipment.

The Electronic Instrument Section CMC, is the exclusive Canadian distributor of electronic test equipment manufactured by Marconi Instruments Limited; — VTVM's — universal bridges, "Q" meters, white noise test sets, signal generators, distortion analyses, oscilloscopes, oscillators, wave analyses; W. H. Sanders (Electronics) Ltd.: precision coaxial and wave guide microwave test equipment and custom built micro-

wave devices. Boonton Electronics Company; — precision inductance and capacitance bridges, RF millivolt meters, sensitive DC meters, automatic resistance bridges; Radio Specialty Mfg. Co.: — FM deviation meter assemblies; Amalgamated Wireless (Aus.) Ltd.: — audio, ultrasonic, MF, HF, UHF and VHF test sets; Beckman Instruments Inc.: — electronic counters, potentiometric recorders, digital volt-meters, industrial counters, industrial systems. The Section also distributes high-quality powerstats and voltage stabilizers manufactured by American Superior Electronics Co. Ltd.

Highly qualified CMC representatives operate out of head office and branch offices to provide present and potential customers an efficient and intelligent source of information, supply and service from coast-to-coast.



1 Marconi Instruments Ltd., environmental test department. A vibration test with stroboscope on a prototype instrument.

2 A CMC instrument technician

performs final pre-delivery checks on a Boonton Electronics inductance bridge.

3 Periodic inspection keeps critical test equipment function-

ing at peak performance. A CMC instrument technician is shown checking a Beckman frequency meter for operational accuracy.

4 Marconi Instruments Ltd., sig-

nal generators TF 995A/5 and A.F. power meter, TF 893A, being used in a two-signal test.

SPECIAL SERVICES DIVISION

Ice build-up on a Tropo-Scatter antenna.



Special Services Division (SSD) was formed in 1952 to carry out a portion of a large installation contract assigned to Canadian Marconi Company by the Canadian Government. Within a very short period, a carefully selected group of highly qualified engineers, technicians, tradesmen and clerical personnel was assembled and, for a period of two years, the group carried out a highly complex installation program at sites in the North Eastern portion of Canada.

Since its formation, SSD has grown into a large organization specializing in the installation, operation and maintenance of radar and communication systems, together with associated plant facilities and supporting services. Its staff has numbered upwards of 1,000 during peak periods and they have seen service and performed their duties in all provinces and territories of Canada.

Special Services Division has participated in all phases of the construction and operation of three major defence systems in Canada. Technicians have installed and tested large proportions of the great diversity of electronics equipments in use. These range from heavy search and height finder radars and extensive Doppler detection systems, to complete communication systems in the microwave UHF, VHF, HF and LF ranges. SSD integrated all the equipment into working systems together with telephone, alarm, recording and other auxiliary items. In conjunction with the technical crews, teams of riggers and linemen erected the associated parabolic, rhombic, and dipole antennas on tall steel masts or other supporting structures and also installed the various wire, coaxial, and waveguide RF feeder lines. During the building of Dewline, Special Services Division technicians and radio operators moved into the Arctic sites with the advance construction crews. They set up the radio airways beacons and communications stations; and, throughout the construction period, they built up and operated a communications network inter-connecting all the Canadian sites and the contractors' rearward staging areas and headquarters.

Maintenance activities are, for the most part, connected with defence lines in the Arctic and Sub-Arctic. SSD personnel operate and maintain extensive communications and detection systems. On one important project, the activities embrace all the supporting services including the maintenance of buildings and grounds, the operation and maintenance of diesel-electric power generation plants and steam-heating systems, the operation of heavy mobile equipment, the operation of stores and supplies, and the co-ordination of helicopter and fixed wing aircraft, tractor trains and sea vessels in the transportation of materials, equipment and personnel to isolated locations.

Another project provides mobile teams of electronic technicians and other highly skilled tradesmen to visit isolated defence sites on the Labrador coast performing repair and overhaul to radar and communication

equipments, associated antennas and transmission lines, mobile vehicles, and diesel power generation equipment. Items which cannot be repaired on site are returned to St. John's, Newfoundland, where the Division operates a maintenance depot, with facilities for performing repair and overhaul work to manufacturers standards. In connection with the depot, a large supply organization supports the maintenance and repair activities and provides emergency support to all the defence sites in the area. As an adjunct to the maintenance and installation activities, SSD has developed an organization specializing in the repair and calibration of test equipment and medical electronic instrumentation. At St. John's and Montreal laboratories the primary and other standards are maintained to support the field operations. All projects have mobile crews regularly visiting the work locations to bring equipment within specifications. As a service to the Department of Transport, the Special Services Division provides a fully-equipped Calibration Van which visits all the departments' communication sites from British Columbia to Newfoundland to perform on-the-spot servicing and calibration of the full range of their test equipment and also provides field service technicians to hospitals and medical institutions to support a wide range of electro-medical equipment.

One of the lesser known services of SSD is the supply of technical representatives to customers who have a need for highly-qualified personnel in the Electronics, Electrical and Diesel-Electric fields. The requirement

usually derives from military organizations, who use these technical representatives to provide knowledge and skills which are beyond the capabilities of local units.

In the civil commercial field, SSD activities are very diverse. Most of the work is associated with communications, but a majority of these projects involve other related activities. The Division has built broadcasting stations in Newfoundland, Quebec, and the Maritimes. This undertaking included such work as clearing and preparing of sites, the design and erection of the transmitting buildings and other services, the installation of transmitting and remote control equipment, the erection and adjustment of directional arrays and complete systems tests. It has built point-to-point radio communications networks and operated these facilities for its customers. The Special Services Division has also designed antenna systems, prepared the installation specifications and drawings, supplied all the materials, erected the pole or steel supporting masts, performed the necessary fabrication work and erected the antennas and associated transmitting lines. In addition to the purely technical requirements of such programs, SSD offers a complete "turnkey" installation service which may include sub-contracting of certain aspects of the work, such as road building, construction, land clearing and catering.

The human drama of Man against the Arctic weather, is an inspiring saga of determination, courage and ingenuity.







1 Complex defence activities, under northern winter conditions, is one of the many areas where the special services division has excelled.

2 Part of the signal generator

repair shop, one among many of the areas where maintenance and repair programs are carried out on customer requirement of electronic test equipment.

3 Special Services Division mo-

bile unit performs test equipment repair and calibration service in areas extending from St. John's, Nfld., to Vancouver Island, B.C.

4 Duplicated radio relay equipment installed in communications

terminal station by special services division.

5 Canadian Marconi equipped, installed and maintained radome site, one of many dotting the North American Air Defence System.



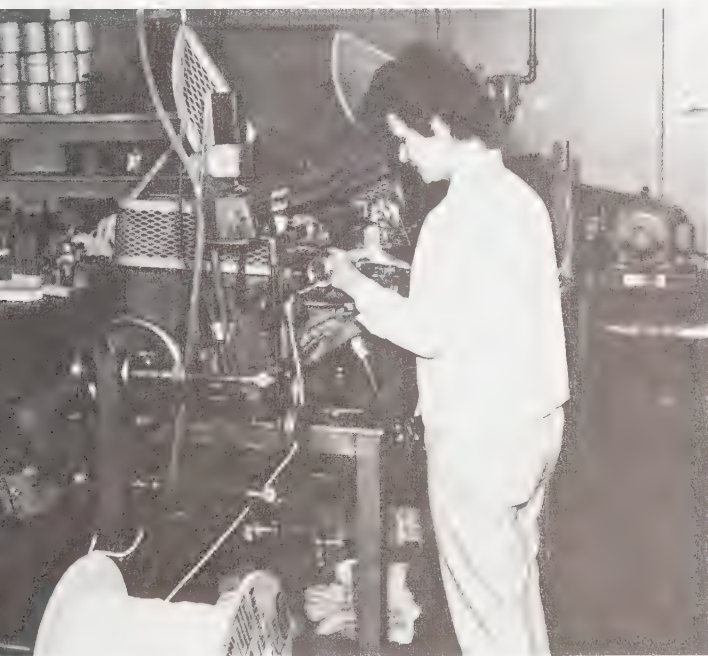
KAAR ELECTRONICS CORPORATION

The acquisition of the assets of Kaar Engineering Corporation, California, now Kaar Electronics Corporation, the newest member of the Canadian Marconi Company group, became another step forward in the CMC advance to serve its growing market in the United States. Kaar has been manufacturing and marketing electronic communications equipment for thirty years, earning a high reputation through the excellence and reliability of its product lines.

The merging of product lines of both Kaar and Canadian Marconi, with almost 100 years of combined engineering, production and sales experience, now enables the United States operation to offer a most comprehensive range of electronic gear for use in the marine, land and mobile fields, with marine radar, marine HF radiotelephones, Marine VHF-FM radiotelephones, single side-band receivers and transceivers, DX Navigator Loran, selective and tone calling units and alerting receivers, citizen's band equipment, VHF-FM base, mobile and repeater equipment, VHF-FM hand-held portables, UHF-FM base, mobile and repeater equipment.

The Kaar, Western region, sales offices located at Mountain View, California.





1 Assembly of TR426A airport mobile and station radiotelephones.

2 Operating the automatic wire cutting and stripping machine.

3 Assembly of citizen band radiotelephones model TR333, with Ukiah plant manager looking on.



CANADIAN MARCONI COMPANY

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Sherbrooke, Canada

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Toronto, Canada

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Chairman and Chief Executive Officer
Canadian Marconi Company
Montreal, Canada

W. V. GEORGE

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Canadian Marconi Company
Montreal, Canada

H. HANSARD

Partner
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Montreal, Canada

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Chairman and Chief Executive
The English Electric Company, Limited
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Director
Canadair Limited
Montreal, Canada

SIR GORDON RADLEY, K.C.B., C.B.E.

Director
The English Electric Company Limited
London, England

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President

L. M. DALEY

Executive Vice President — Operations

A. G. McCAUGHEY, C.A.

Executive Vice President — Finance and Administration
and Secretary Treasurer

F. B. DANCER

Vice President and Comptroller

S. B. HAYWARD

Vice President — Broadcasting Division

W. R. BITCHENO

Vice President — Commercial Products Division

J. H. MARTIN

Vice President — Marine and Land Communications Division

R. MACLEOD

Vice President — Special Services Division

J. A. HOWLETT

Vice President — Industrial Relations Division

C. W. PERRY

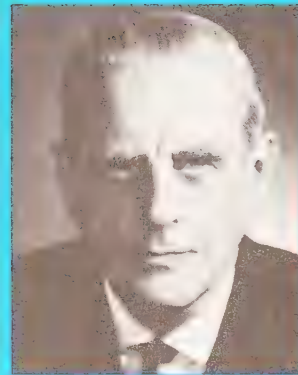
Assistant Secretary

E. D. HICKIN

Assistant Treasurer



S. M. Finlayson



W. V. George



L. M. Daley



A. G. McCaughey, C.A.



F. B. Dancer



S. B. Hayward



W. R. Bitcheno



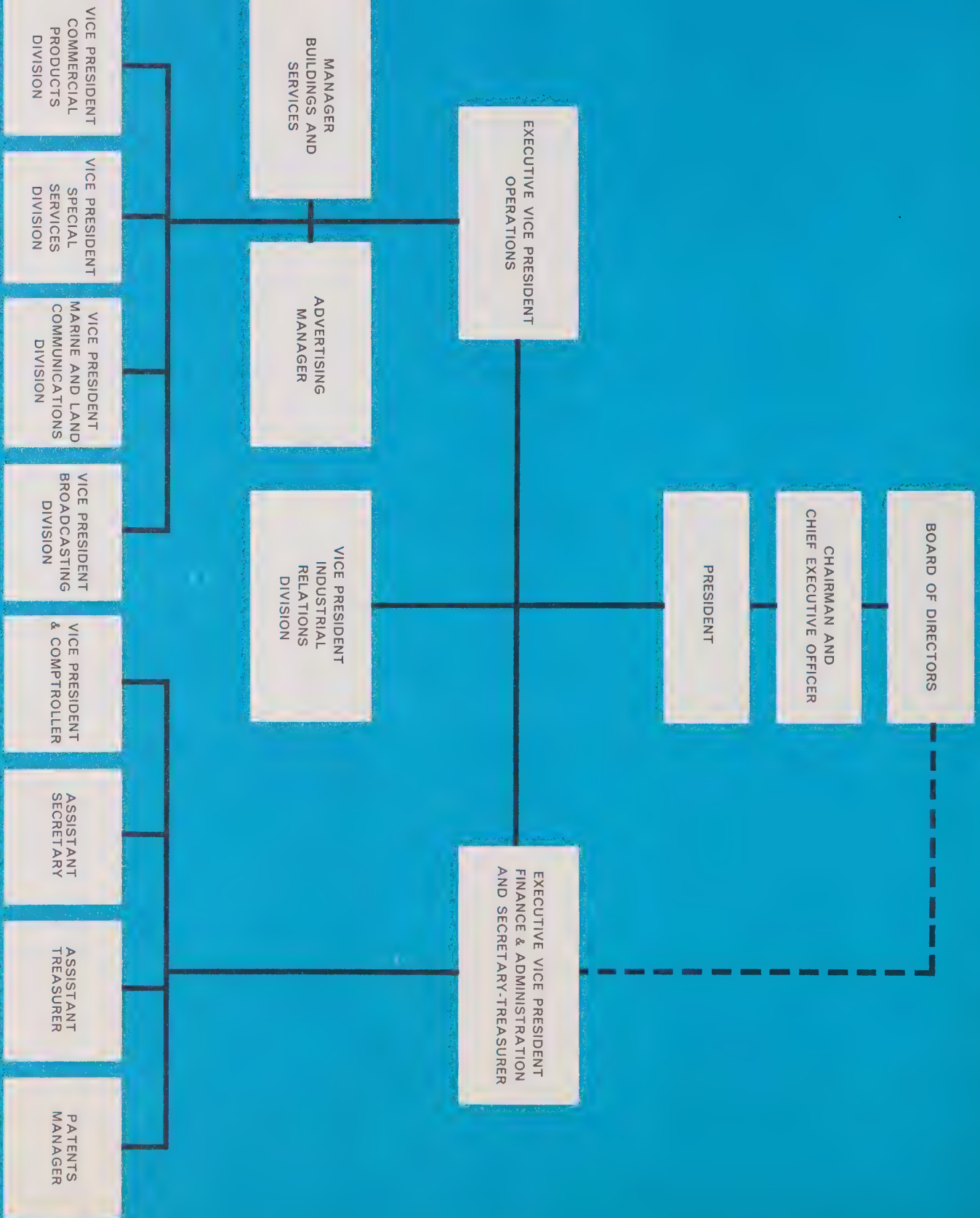
J. H. Martin



R. MacLeod



J. A. Howlett



CANADIAN MARCONI COMPANY group of companies



CANADA



CANADIAN MARCONI COMPANY

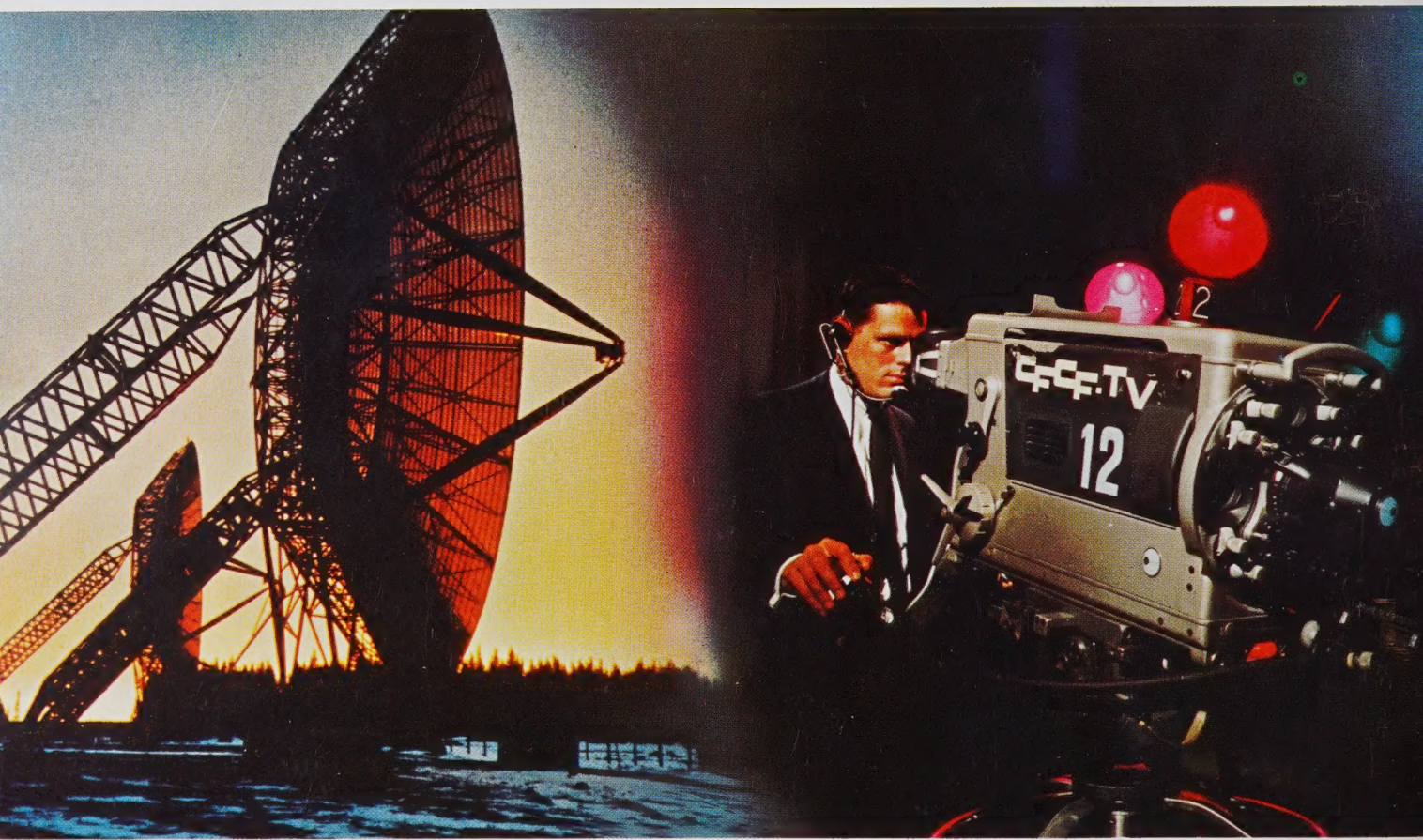
UNITED STATES

KAAR ELECTRONICS CORPORATION

MEXICO

INDUSTRIAS DE RADIOCOMUNICACION, S.A.







PRODUCTS AND SERVICES

Broadcasting Division

Television and Radio broadcasting of entertainment, education and information over CFCF-TV, Channel 12, CFCF-AM (600 kc.), CFQR-FM (92.5 mc.), CFCX-SW (6005 kc.), Montreal. Producers of programs. Producers of commercials.

Commercial Products Division

Airborne Doppler sensors for fixed and rotary wing aircraft. Airborne computers and indicators for navigational and tactical use. Altimeters. High frequency transmitters and receivers, including single sideband systems. Tactical radio relay equipment. Repair and overhaul facilities for all products. System engineering of navigation and communications systems.

Marine & Land Communications Division

High frequency AM and single sideband and very high frequency FM radiotelephone equipment. Selective and tone calling units. Television transmitters, cameras and associated apparatus. Directions finders. Echo sounders. Fish finders. Loran. Marine radar. Precision electronic test instruments and industrial control systems.

Special Services Division

Repair and Overhaul of large fixed radar systems, communications and air navigation equipment and systems, from three depots in Montreal and St. John's, Nfld. Installation, maintenance and operation of commercial and defence communications systems including diesel engine power generation. Test equipment repair and calibration service.

CANADIAN MARCONI COMPANY

2442 TRENTON AVENUE, MONTREAL 16, P.Q.

and its wholly owned subsidiary

KARR ELECTRONICS CORPORATION

1203 WEST ST. GEORGE AVENUE, LINDEN, N.J.



INTERIM REPORT TO THE SHAREHOLDERS

FIRST HALF
1967

CANADIAN MARCONI COMPANY

The First Name in Radio-Electronics





CANADIAN MARCONI COMPANY AND SUBSIDIARY COMPANIES

CONSOLIDATED STATEMENT OF INCOME

FOR THE SIX MONTHS ENDED JUNE 30*

SALES AND REVENUES

	1967	1966
Income from Operations before undernoted items	\$32,128,000	\$27,076,000
Less Depreciation	\$ 1,101,570	\$ 2,909,412
Interest	1,313,637	1,217,335
Income taxes	582,125	416,287
	—	550,000
NET (LOSS)/INCOME FOR THE PERIOD	(\$ 794,192)	\$ 725,790

CONSOLIDATED STATEMENT OF SOURCE AND APPLICATION OF FUNDS

SOURCE OF FUNDS:

Net income	\$ —	\$ 725,790
Depreciation	1,313,637	1,217,335
Proceeds of issue of common shares	2,161,160	—
Proceeds of issue of debentures, Series B	3,412,500	—
Decrease in working capital	—	959,020
	\$ 6,887,297	\$ 2,902,145

APPLICATION OF FUNDS:

Net loss	\$ 794,192	\$ —
Dividends paid	297,160	270,145
Capital asset additions, net	1,088,338	2,632,000
Increase in working capital	4,707,607	—
	\$ 6,887,297	\$ 2,902,145

*Unaudited Interim Report

TO THE SHAREHOLDERS

Income from operations during the first half of 1967 was sharply reduced from that of the previous year and, after making full provision for depreciation amounting to \$1,313,637, there was a net loss for the period of \$794,192 compared with a net profit of \$725,790 in 1966.

Sales and revenues were ahead of the same period last year. Our commercial business is operating at a satisfactory level and the loss of our U.S. subsidiary has been reduced.

The net loss was anticipated at the annual meeting of shareholders held in March and in the offering letter and prospectus related to our recent share and debenture financing. It results from continued and increasing development and pre-production expenditure on three major avionic products which will not result in significant plant loading until next year. Another contributing factor is the production of tactical radio relay equipment to meet NATO requirements which is increasing but has not yet reached the level expected because of delayed receipt of firm orders.

On June 1 the Company received \$2,161,160 from the issue of 540,290 shares offered to shareholders on the basis of one for every ten held at \$4 each and \$3,412,500 from the issue of \$3,500,000 7%

Debentures, Series B. This successful financing by the Company improved both working capital and the relation of debt to equity.

At a meeting of the Board of Directors held on June 28, 1967, the resignation of Mr. W. V. George as President and a director was accepted with regret following his request for early retirement for reasons of health. Mr. L. M. Daley, previously Executive Vice President, Operations, was appointed a director and elected President.

Operations in the second half of the year are expected to result in a net profit somewhat greater than the loss of the first half resulting in a small profit for the year as a whole.

A semi-annual dividend of five cents per share was paid on June 30, 1967 to shareholders of record June 9, 1967.

On behalf of the Board of Directors

Chairman and Chief Executive Officer

Montreal, Quebec
August 1, 1967